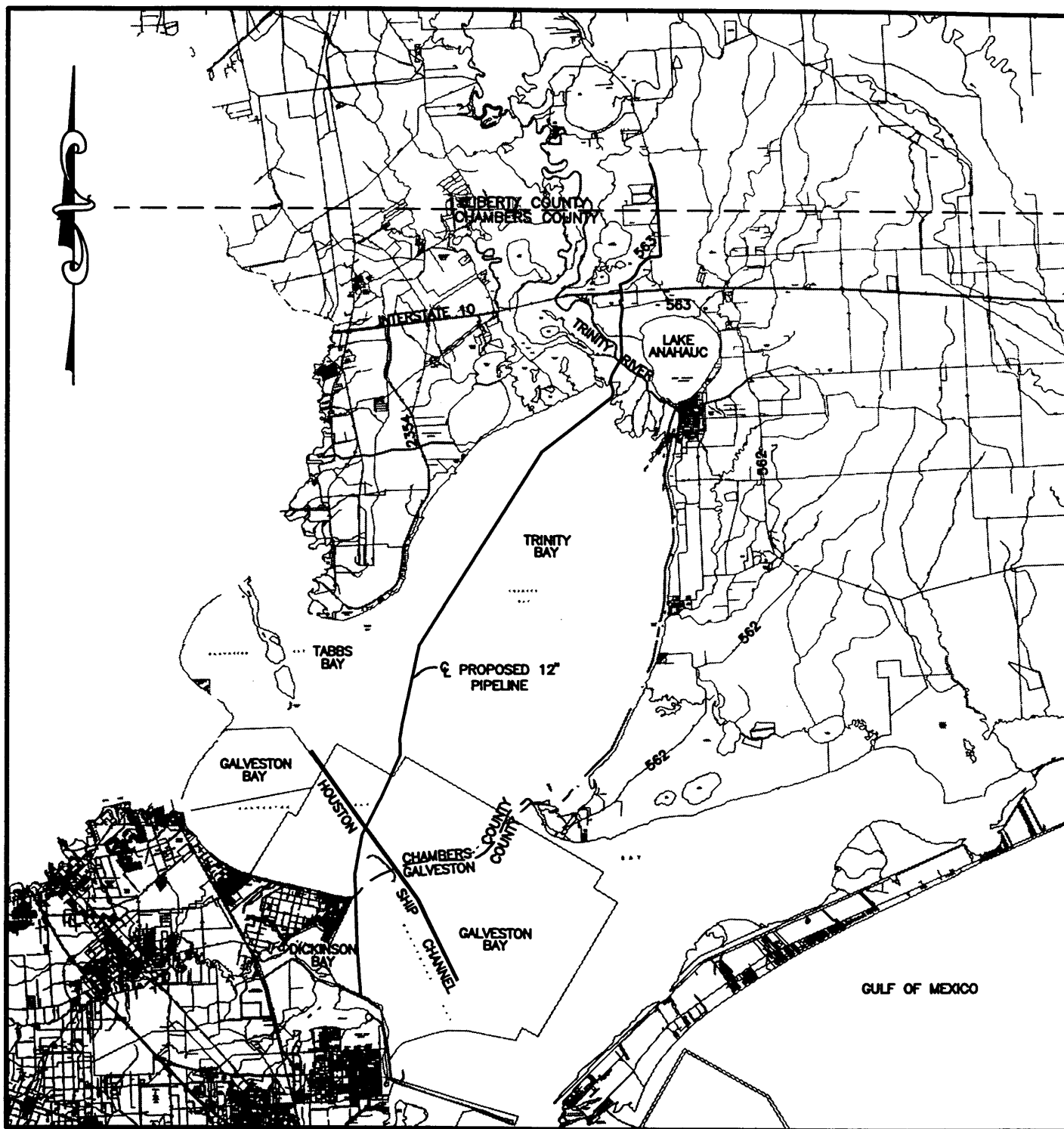


# GALVESTON, CHAMBERS & LIBERTY COUNTIES, TEXAS



Scale in Feet  
30,000' 15,000' 0 15,000' 30,000'

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 1 of 39

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

**PROPOSED 12" PIPELINE  
ROUTE MAP**  
GALVESTON, CHAMBERS & LIBERTY COUNTIES, TEXAS

NO. DATE



**BUCKEYE GULF COAST PIPE LINES, L.P.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

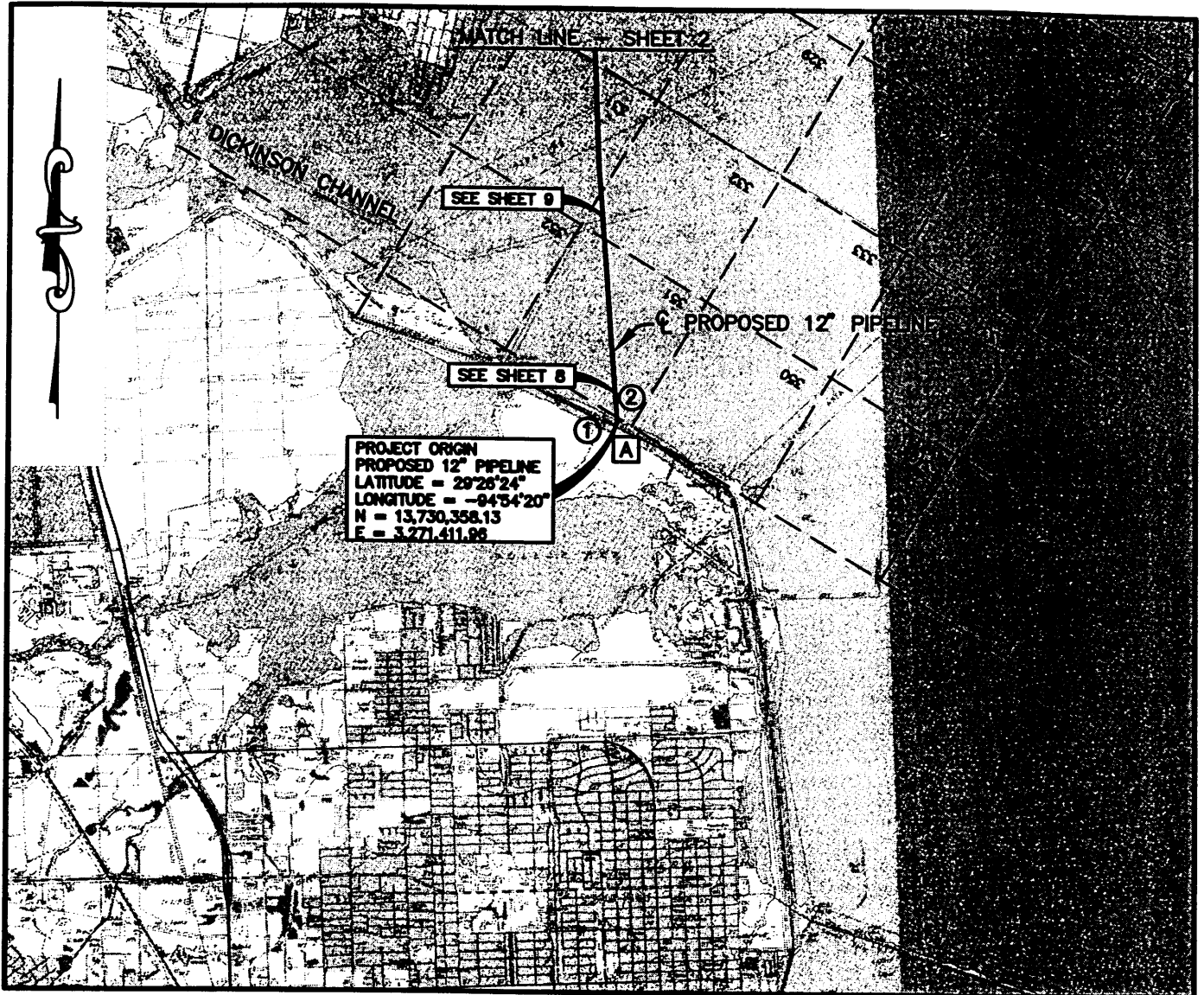
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**SHEET 1 OF 31**

CAD FILE: 2195100\_ REV. 0

DEC 22 2003

# LIBERTY, CHAMBERS & GALVESTON COUNTIES, TEXAS



- ① 100' x 150' DRILL SITE
- ② 150' x 200' DRILL SITE

Ⓐ CITY OF TEXAS CITY



*Fred P. Langham* 12/19/03

**Fred P. Langham**  
Registered Professional Land Surveyor No. 4215

NOTE: ALL COORDINATES SHOWN ARE BASED  
ON THE TEXAS COORDINATE SYSTEM SOUTH  
CENTRAL ZONE. (NAD 83)



SCALE IN FEET

ASSOCIATION: ILS OF  
Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 2 of 35

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW

DRAWN BY: RCM	DATE: 12/16/03
CHECKED BY: G&A	DATE: 12/16/03
SCALE: NOTED	

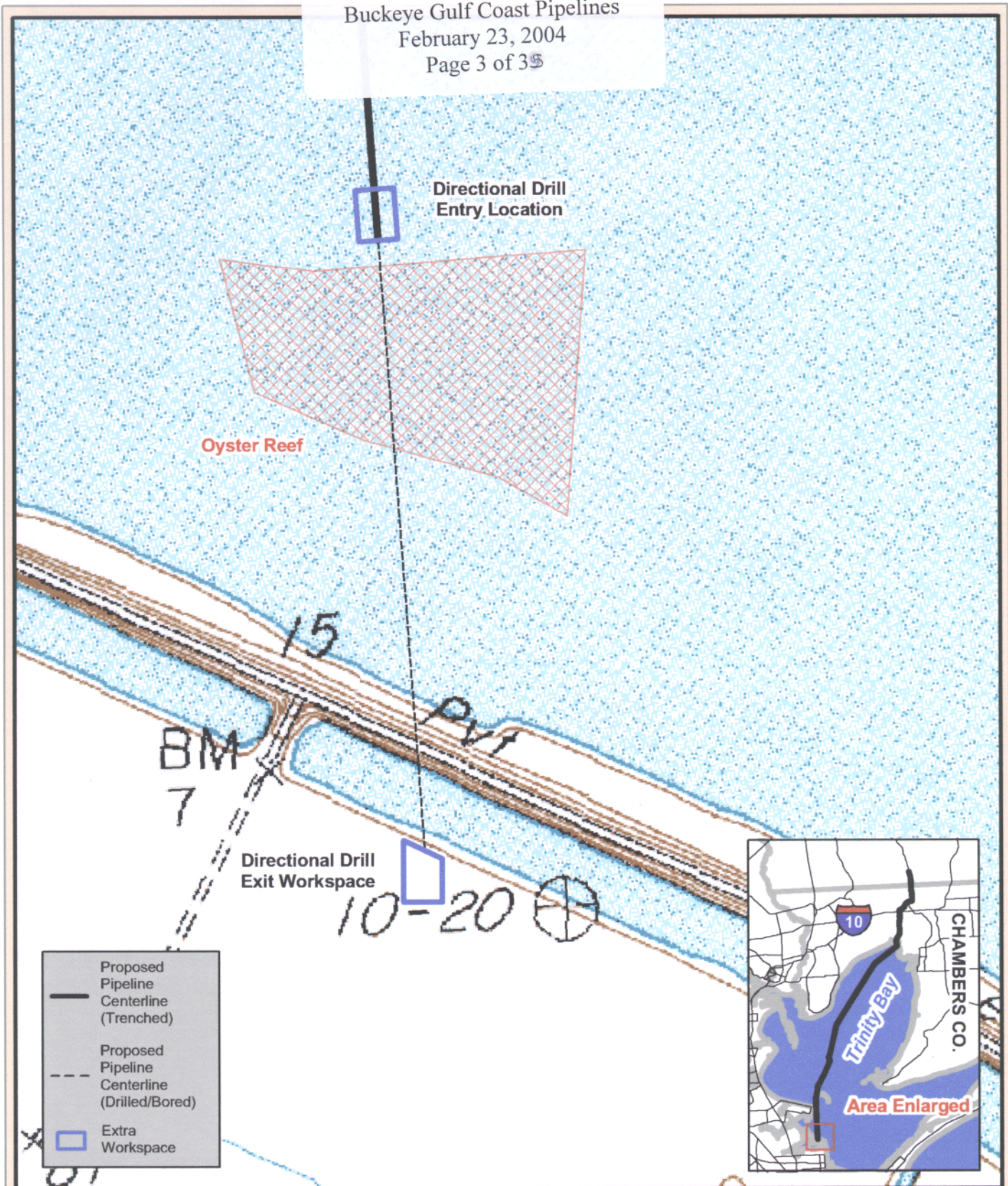
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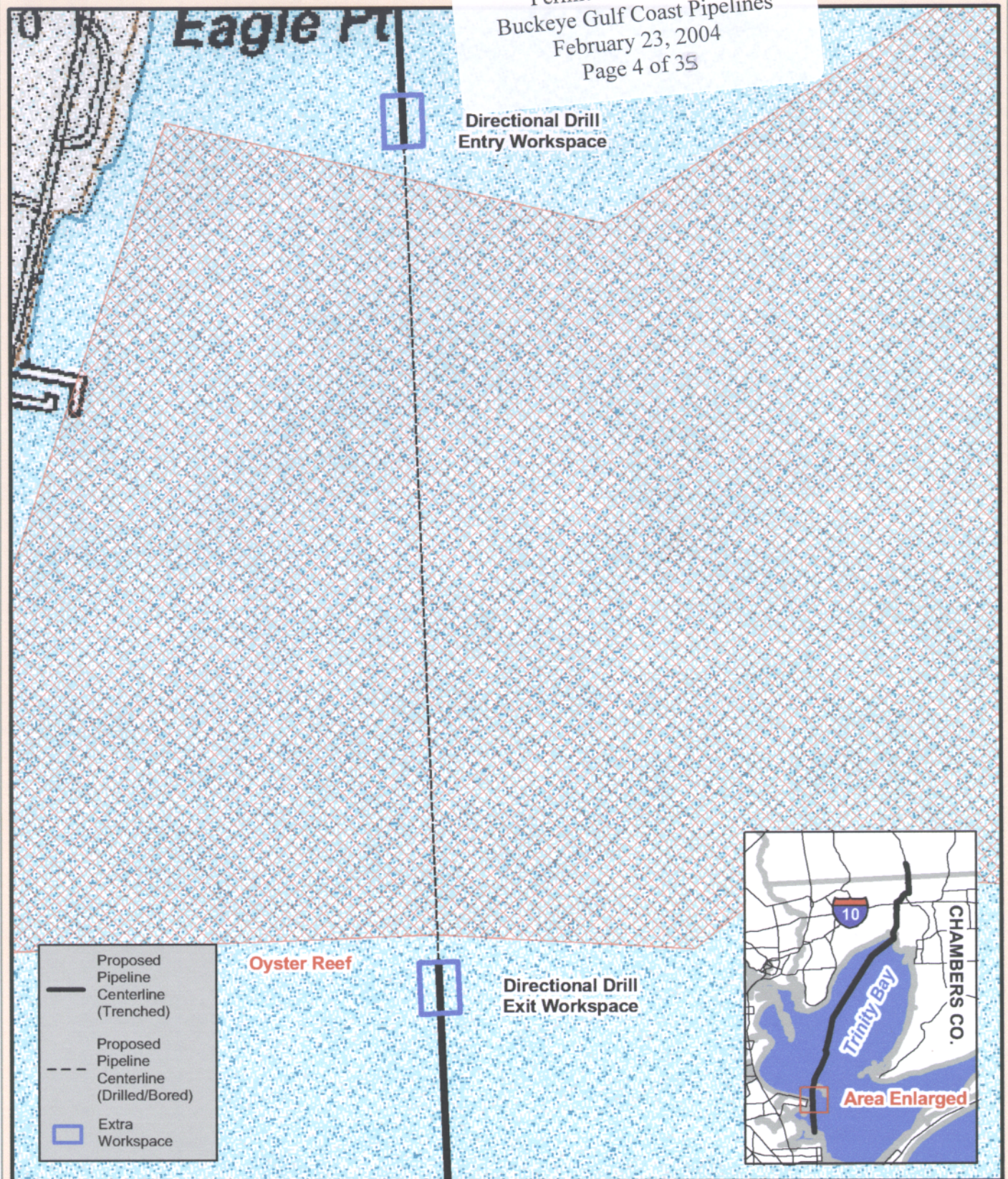
**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

File Date: 12/16/03 14:05 RCM 2195106\_1-8000









- Proposed Pipeline Centerline (Trenched)
- Proposed Pipeline Centerline (Drilled/Bored)
- Extra Workspace



**SWCA**  
ENVIRONMENTAL CONSULTANTS

## Proposed Moss Bluff To Texas City Pipeline Extra Workspace Map

Liberty, Chambers, and Galveston Counties, Texas

Sheet 4 of 5

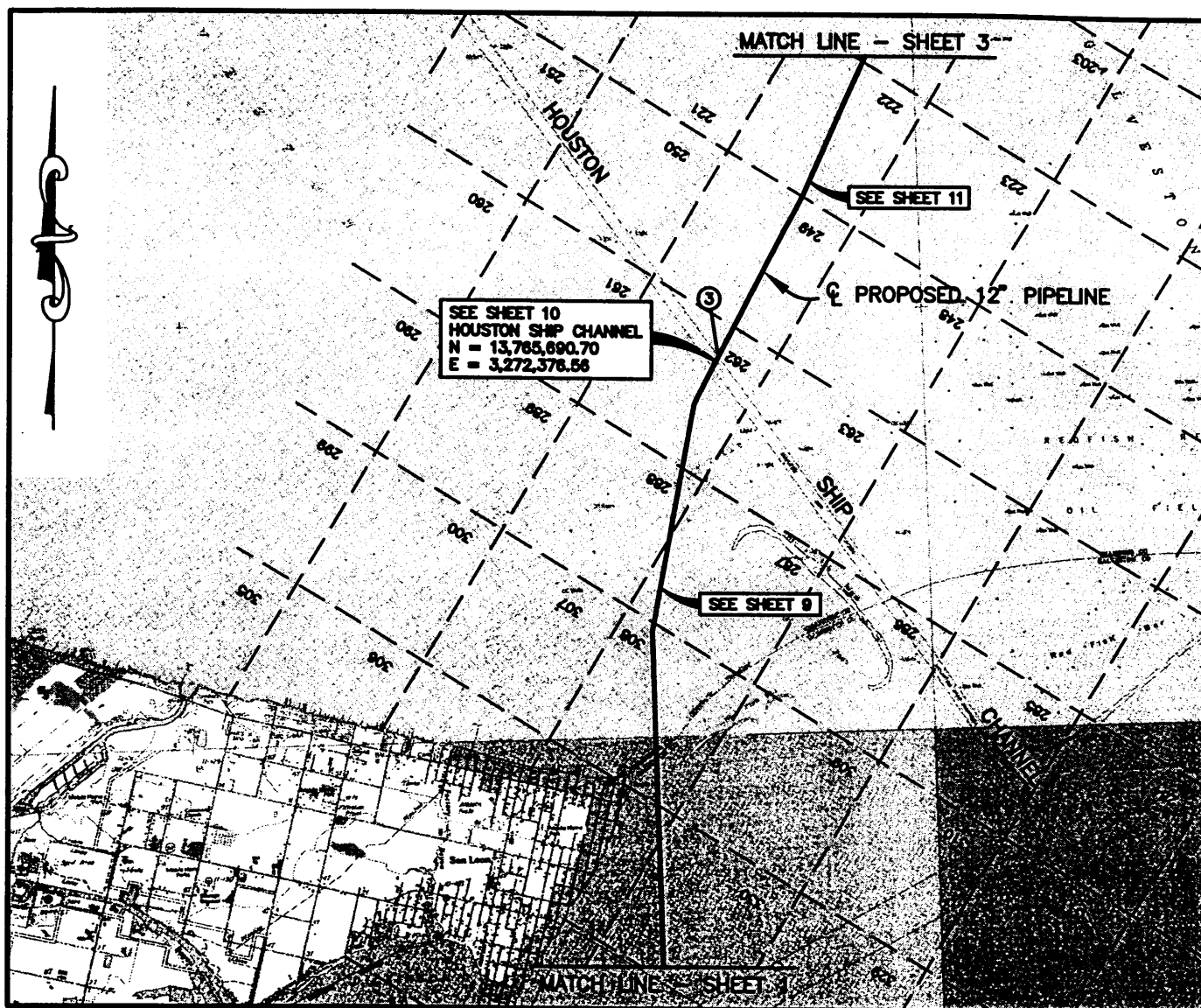
Background: Texas City, TX,  
7.5' DRG (1982)

0 250 500 Feet

Map Produced January 27, 2004  
Project #: 7362-147



# LIBERTY, CHAMBERS & GALVESTON COUNTIES, TEXAS



- ③ 150' X 200' DRILL SITE  
(EACH SIDE OF HOUSTON SHIP CHANNEL)



*Fred P. Langham* 12/19/03

Fred P. Langham  
Registered Professional Land Surveyor No. 4215

APPLICATION: U.S. COE

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 5 of 35

NOTE: ALL COORDINATES SHOWN ARE BASED  
ON THE TEXAS COORDINATE SYSTEM SOUTH  
CENTRAL ZONE. (NAD 83)



**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW

**SHEET 3 OF 31**

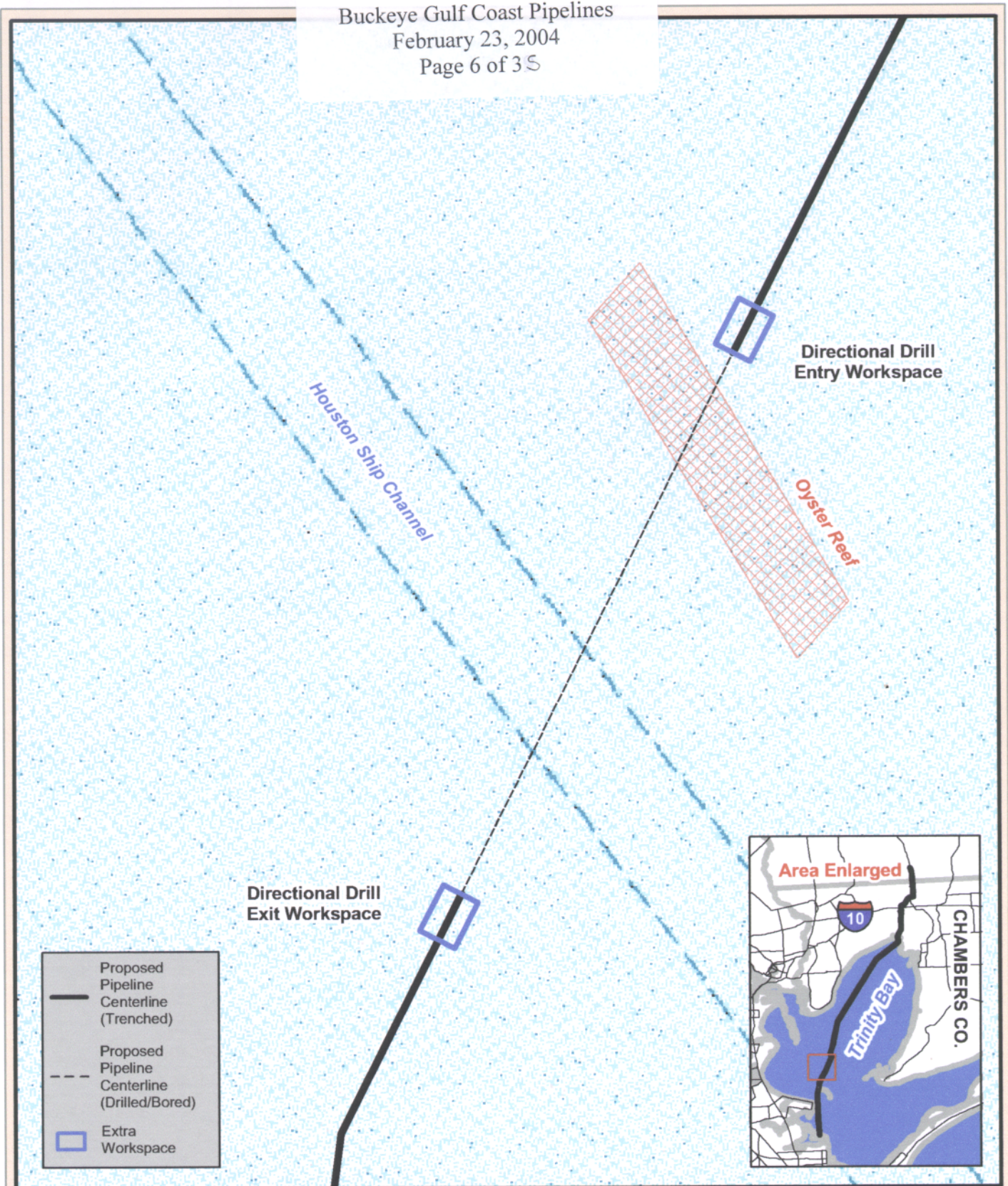
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CAD FILE: 2195105\_ REV. 0



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(713) 644-8219





**SWCA**  
ENVIRONMENTAL CONSULTANTS

**Proposed Moss Bluff To Texas City Pipeline  
Extra Workspace Map**  
Liberty, Chambers, and Galveston Counties, Texas

Sheet 3 of 5

Background: Baciff, TX,  
7.5' DRG (1982)

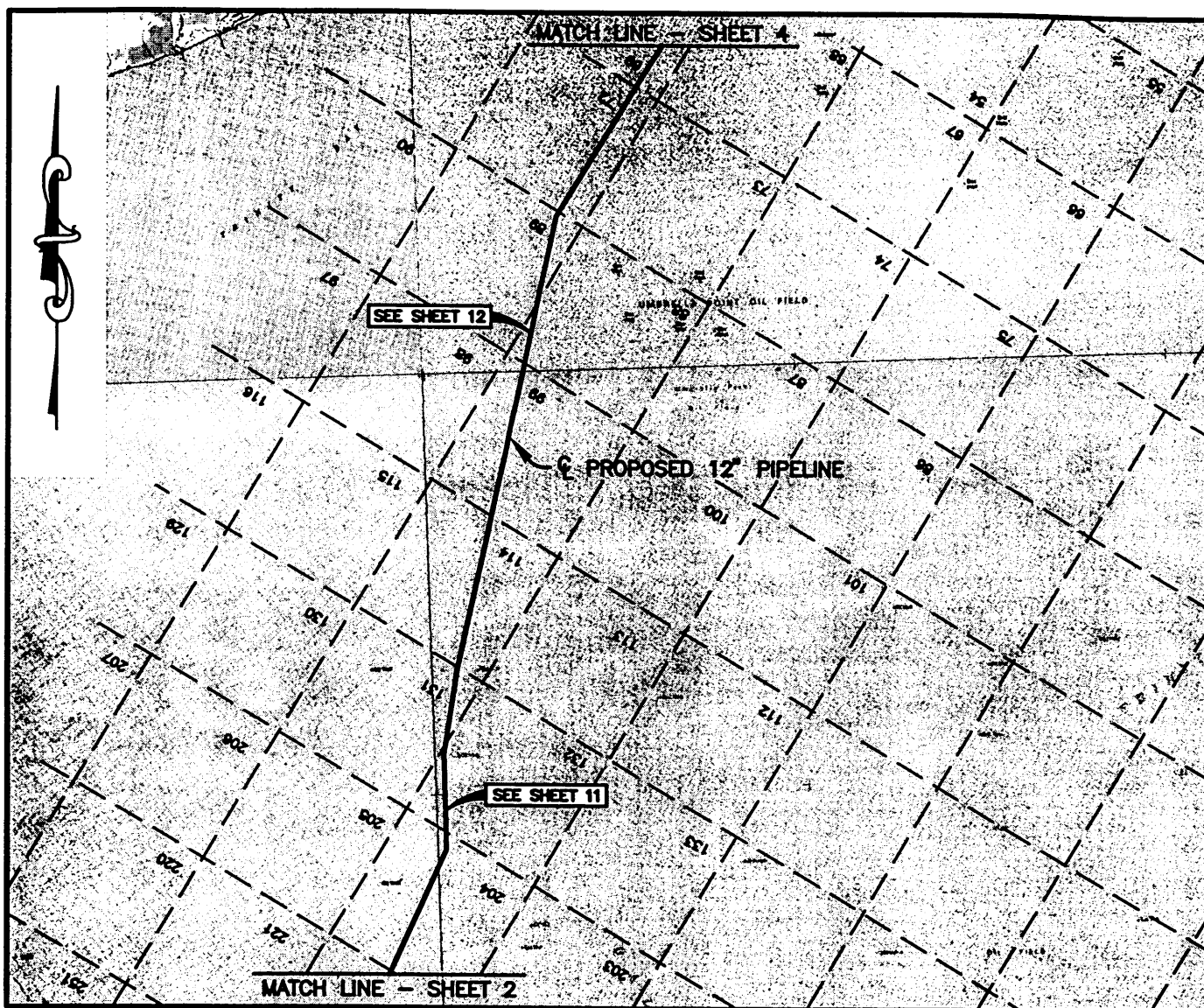
0 250 500 Feet

Map Produced January 27, 2004  
Project #: 7362-147



DEC 22 2003

# LIBERTY, CHAMBERS & GALVESTON COUNTIES, TEXAS



*Fred P. Langham 12/19/03*

Fred P. Langham  
Registered Professional Land Surveyor No. 4215

NOTE: ALL COORDINATES SHOWN ARE BASED  
ON THE TEXAS COORDINATE SYSTEM SOUTH  
CENTRAL ZONE. (NAD 83)



Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 7 of 35

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW

NO. DATE

BY



**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

DRAWN BY: G&A DATE: 11/13/03  
CHECKED BY: G&A DATE: 10/20/03  
SCALE: NOTED

**SHEET 4 OF 31**

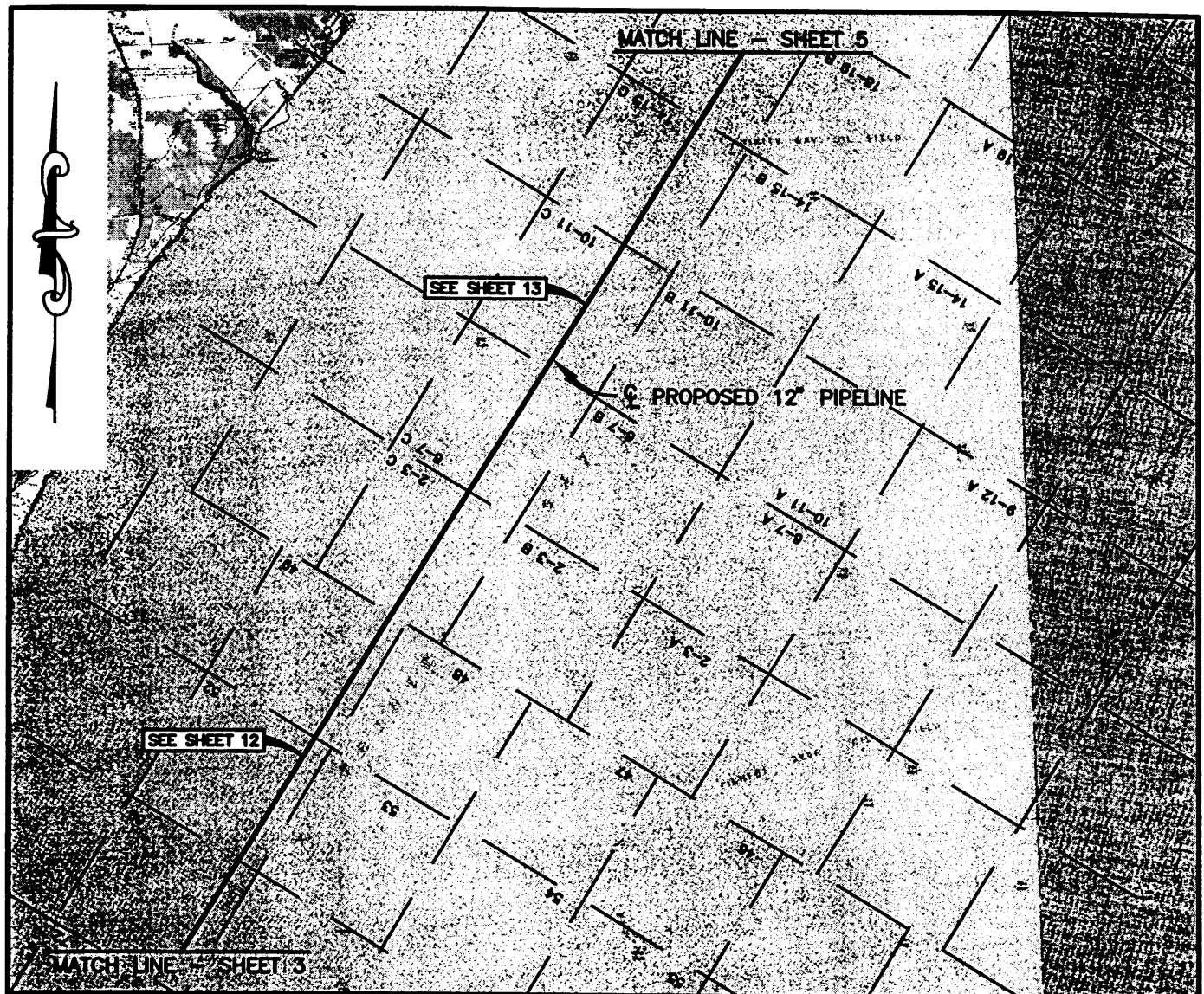
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DEC 22 2003

# LIBERTY, CHAMBERS & GALVESTON COUNTIES, TEXAS



*Fred P. Langham 12/19/03*

**Fred P. Langham**  
Registered Professional Land Surveyor No. 4215

NOTE: ALL COORDINATES SHOWN ARE BASED  
ON THE TEXAS COORDINATE SYSTEM SOUTH  
CENTRAL ZONE. (NAD 83)



Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 8 of 35

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW

NO.	DATE	REVISION	BY

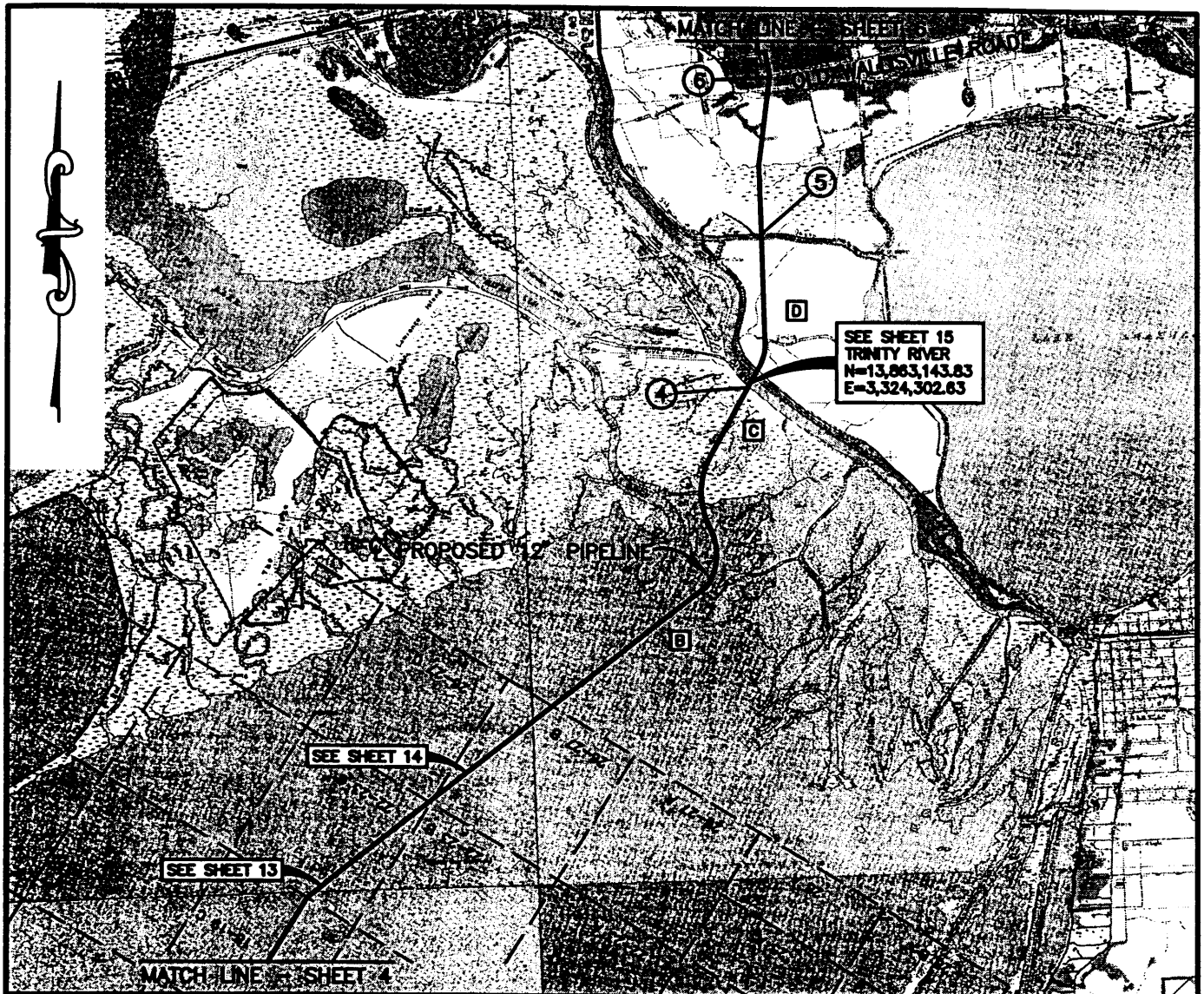
**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

DRAWN BY: G&A	DATE: 10/20/03	<b>SHEET 5 OF 31</b>
CHECKED BY: G&A	DATE: 10/20/03	
SCALE: NOTED	CAD FILE: 2195103_	
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File Date 12/09/03 4:10 PM 2195103\_1-6000



# LIBERTY, CHAMBERS & GALVESTON COUNTIES, TEXAS



- ④ 100' x 150' DRILL SITE NORTH & SOUTH BANK TRINITY RIVER
- ⑤ 100' x 150' DRILL SITE NORTH & SOUTH BANK HOG BAYOU
- ⑥ 150' x 200' LAND PUSH SITE

B. GENERAL LAND OFFICE  
C. SHERWOOD HEALTH CARE, INC.  
D. JOHN G. MIDDLETON, et al

NOTE: ALL COORDINATES SHOWN ARE BASED ON THE TEXAS COORDINATE SYSTEM SOUTH CENTRAL ZONE. (NAD 83)



SCALE IN FEET

*Fred P. Langham*  
Fred P. Langham  
Registered Professional Land Surveyor No. 4215

Registered Professional Land Surveyor No. 4215

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 9 of 35

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW

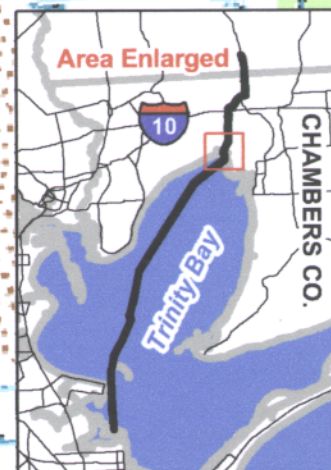
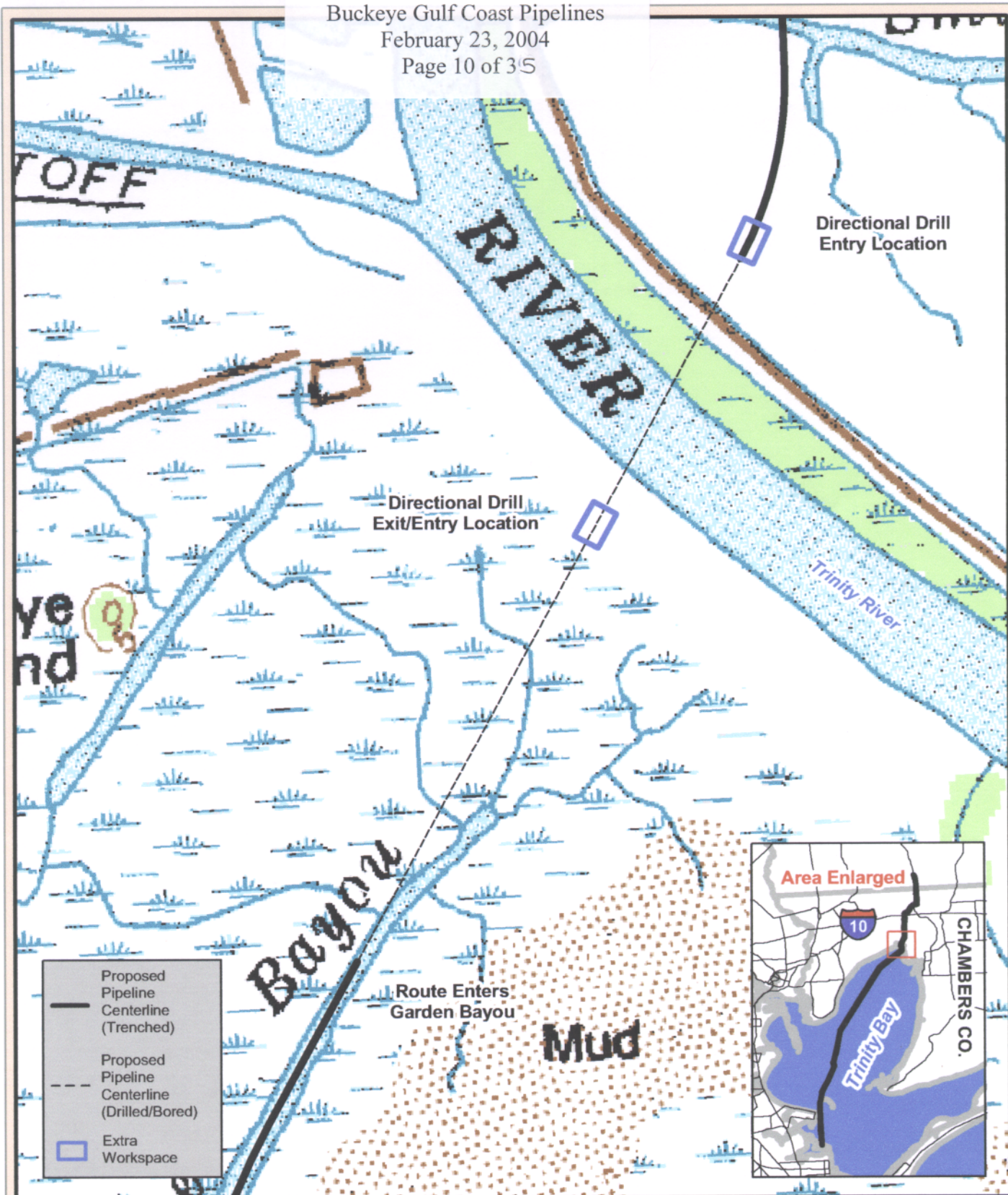
**SHEET 6 OF 31**

**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

DRAWN BY: G&A DATE: 10/20/03  
CHECKED BY: G&A DATE: 10/20/03  
SCALE: NOTED

CAD FILE: 2195102\_ REV. 0





**SWCA**  
ENVIRONMENTAL CONSULTANTS

**Proposed Moss Bluff To Texas City Pipeline  
Extra Workspace Map**  
Liberty, Chambers, and Galveston Counties, Texas

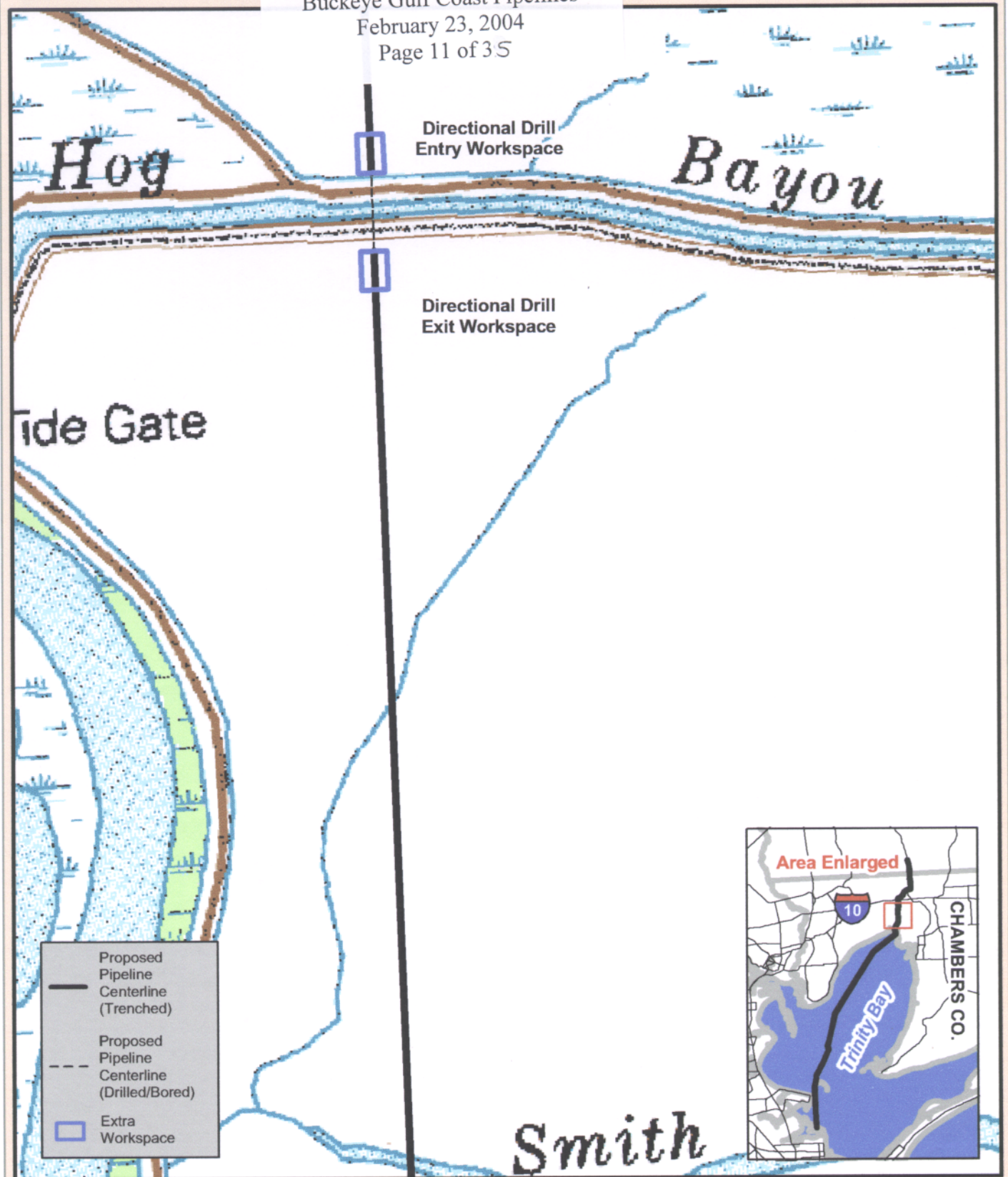
Sheet 2 of 5

Background: Anahuac, TX,  
7.5' DRG (1982)

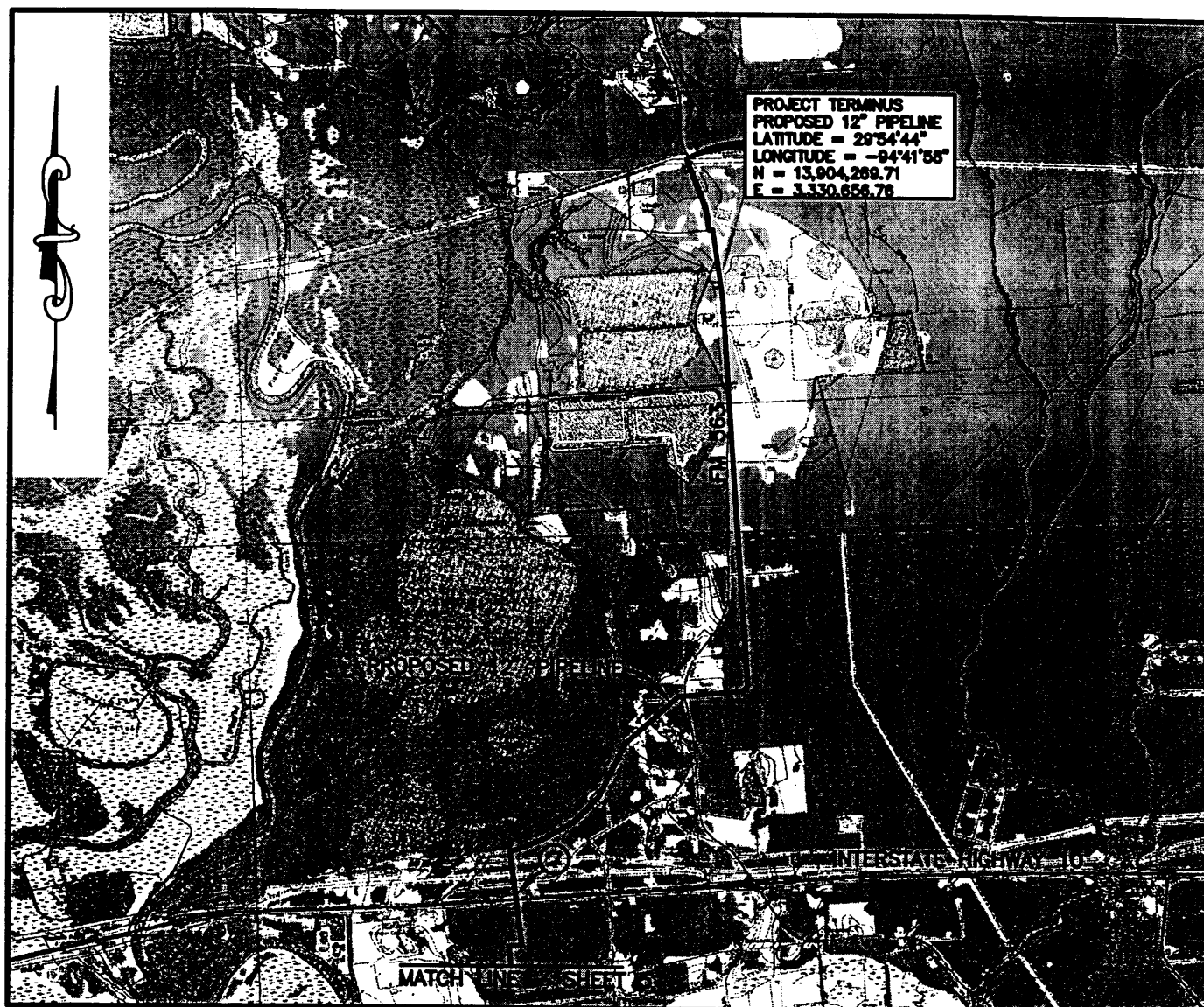
0 250 500 Feet

Map Produced January 27, 2004  
Project #: 7362-147





## LIBERTY, CHAMBERS &amp; GALVESTON COUNTIES, TEXAS



⑦ 100' x 150' DRILL SITE NORTH  
& SOUTH OF I-10



*Fred P. Langham* 12/19/03

Fred P. Langham  
Registered Professional Land Surveyor No. 4215

NOTE: ALL COORDINATES SHOWN ARE BASED  
ON THE TEXAS COORDINATE SYSTEM SOUTH  
CENTRAL ZONE. (NAD 83)

6000' 3000' 0' 6000' 12000'



SCALE IN FEET

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN VIEW



**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

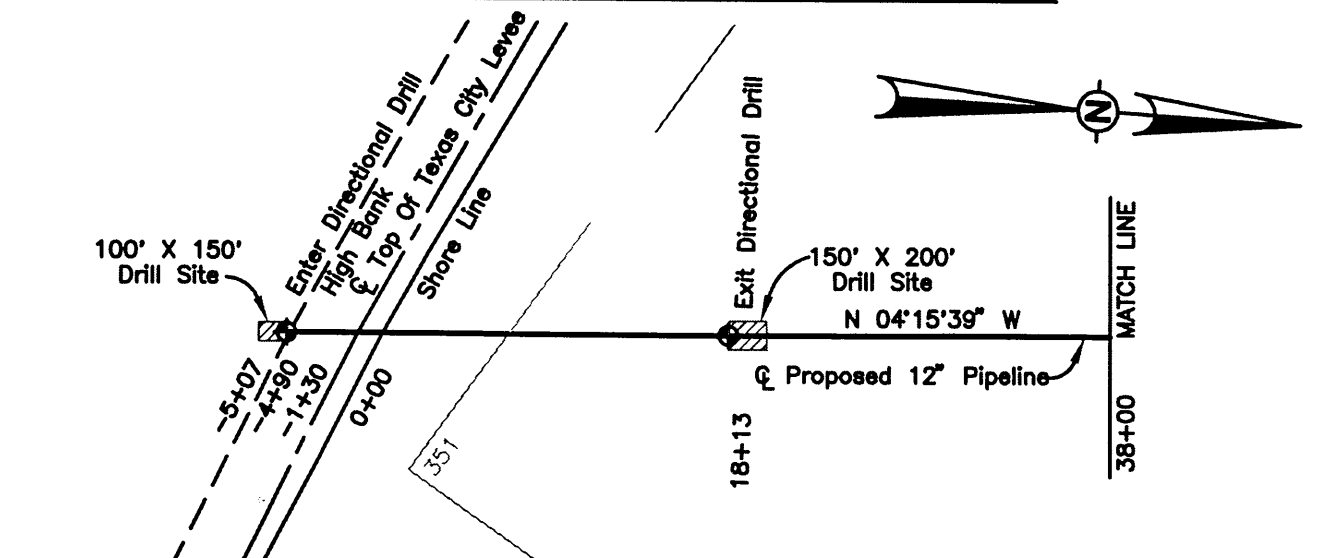
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**SHEET 7 OF 31**

CAD FILE: 2195101\_ REV. 0



# GALVESTON COUNTY, TEXAS

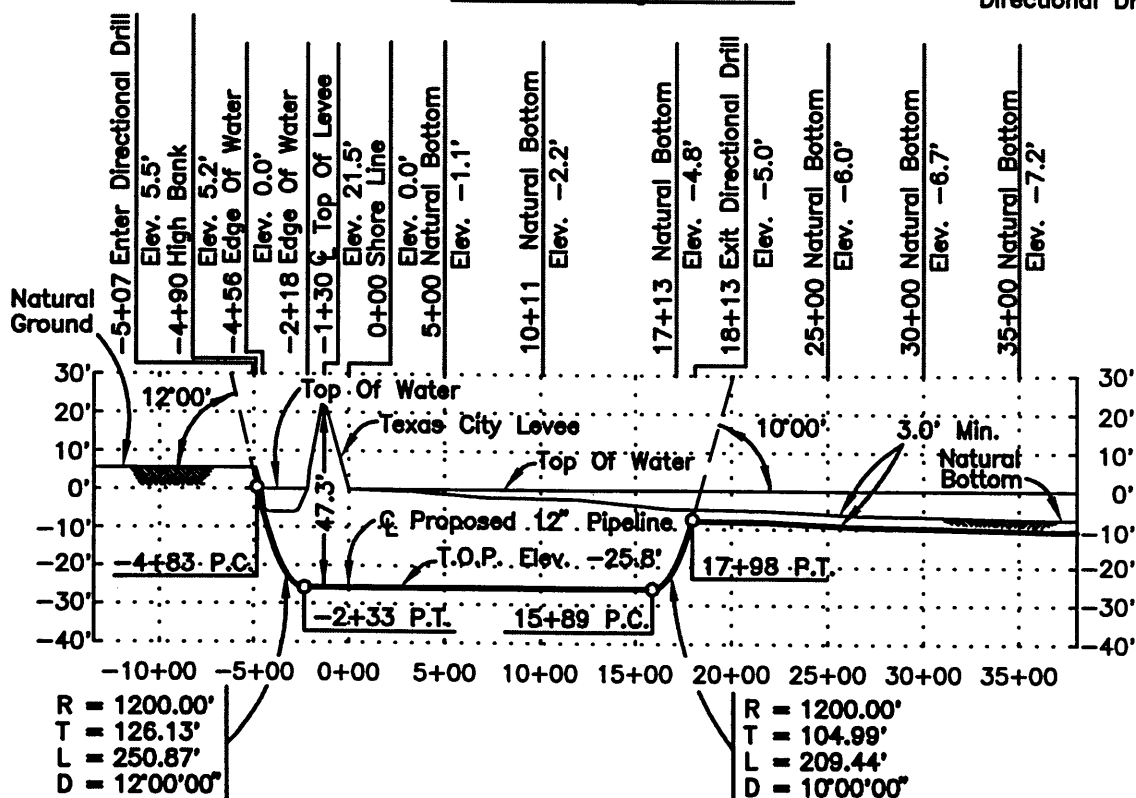


## PLAN

Scale: 1" = 1000'

## Texas City Levee

Note: Pipeline will be installed by Directional Drill.



## PROFILE

Scale: 1" = 1000', Horz.  
1" = 50', Vert.

T.B.M. - Corps Of Engineers tide gauge located in the north wall of the Texas City Flood gate at the entrance to Dollar Bay. Elev. 0.0' M.L.T.

### PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/ FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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## BUCKEYE GULF COAST PIPE LINES, L.P.

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER TEXAS CITY LEVEE  
GALVESTON COUNTY, TEXAS

SHEET 8 OF 31

**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 844-9210

DRAWN BY: G&A DATE: 12/03  
CHECKED BY: G&A DATE: 12/03

No. 12/17/03 2:30 AM 2195127\_1"=1000'

## DEC 22 2003



## Dickinson Channel

**T.B.M. - Corps Of Engineers tide gauge located in the north wall of the Texas City Flood gate at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.**

# PROFILE

## PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API5L X52 ERW PIPE  
w/FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

**GALVESTON & CHAMBERS COUNTIES, TEXAS**

**SHEET 9 OF 31**

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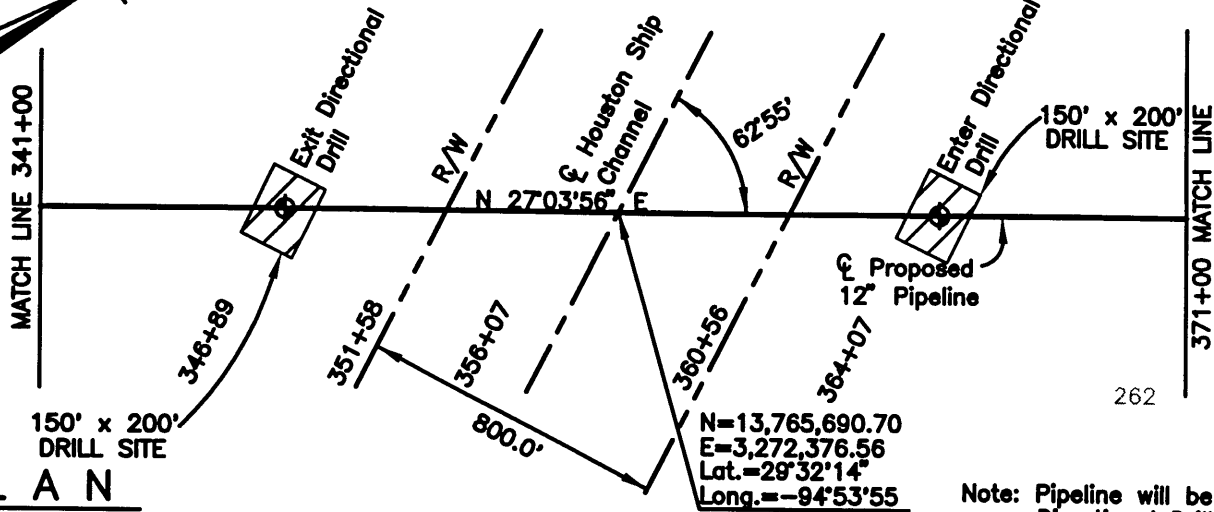
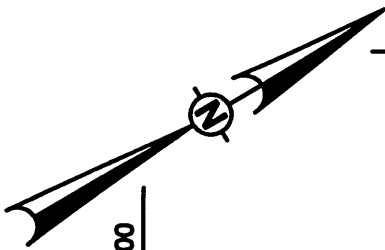
**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

DRAWN BY: G&A	DATE: 12/03
CHECKED BY: G&A	DATE: 12/03
SCALE: 1"=5000' W.O.	



# CHAMBERS COUNTY, TEXAS

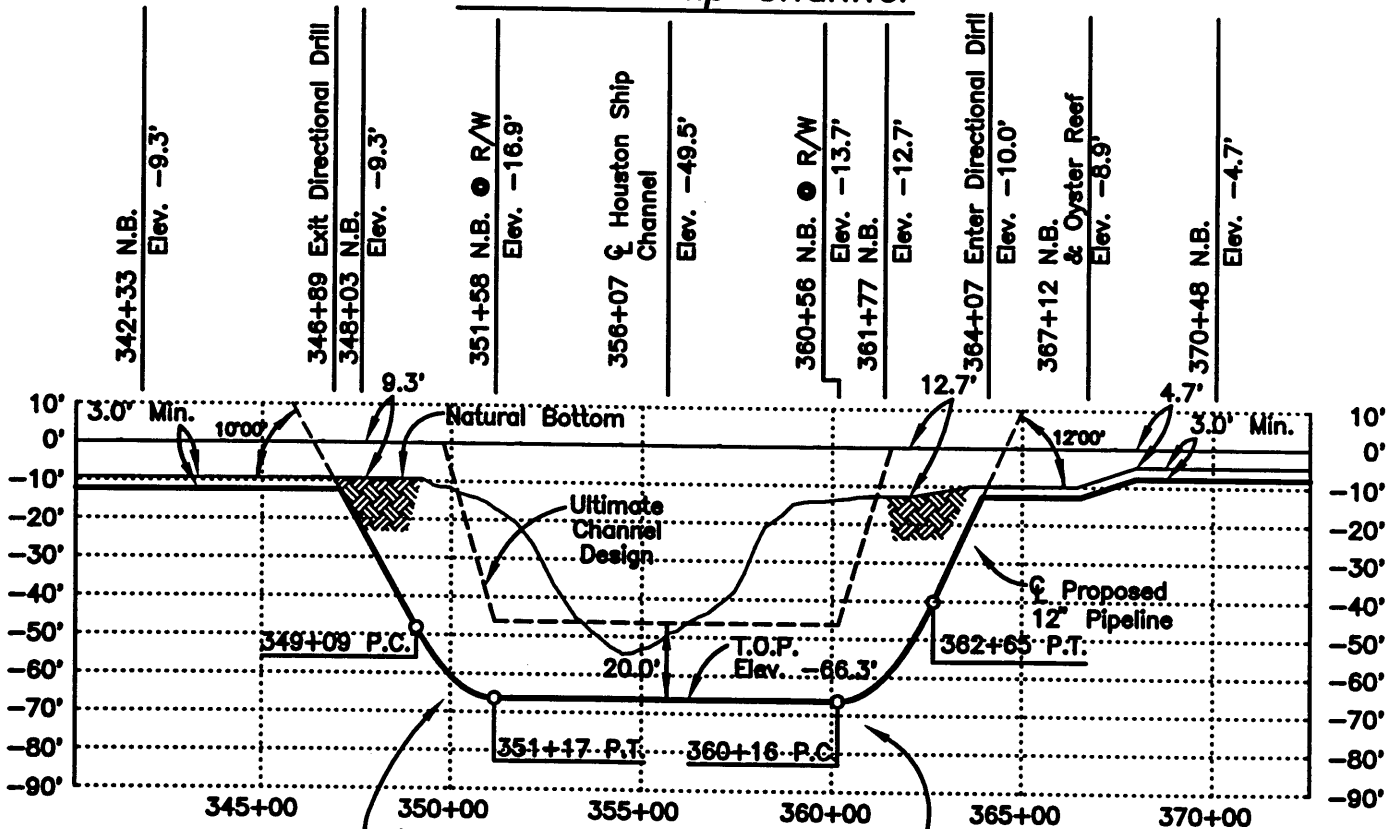
DEC 22 2003



**PLAN**

Scale: 1" = 500'

## Houston Ship Channel



**PROFILE**

Scale: 1" = 500' Horizontal  
1" = 50' Vertical

R = 1,200.00'  
L = 251.33'  
T = 126.13'  
D = 12'00'00"

R = 1,200.00'  
L = 209.44'  
T = 104.99'  
D = 10'00'00"

T.B.M. - Corps Of Engineers tide gauge located in the north wall of the Texas City Flood gate at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.

### PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

## BUCKEYE GULF COAST PIPE LINES, L.P.

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER HOUSTON SHIP CHANNEL  
CHAMBERS COUNTY, TEXAS

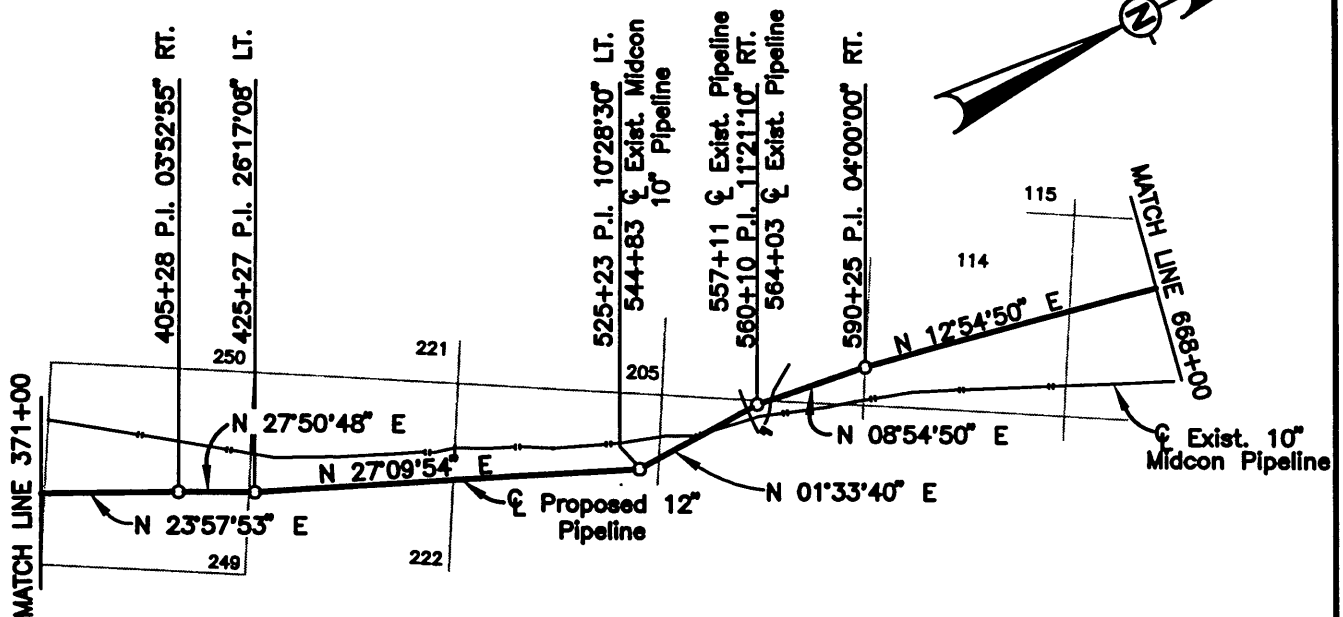
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**SHEET 10 OF 31**

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# CHAMBERS COUNTY, TEXAS

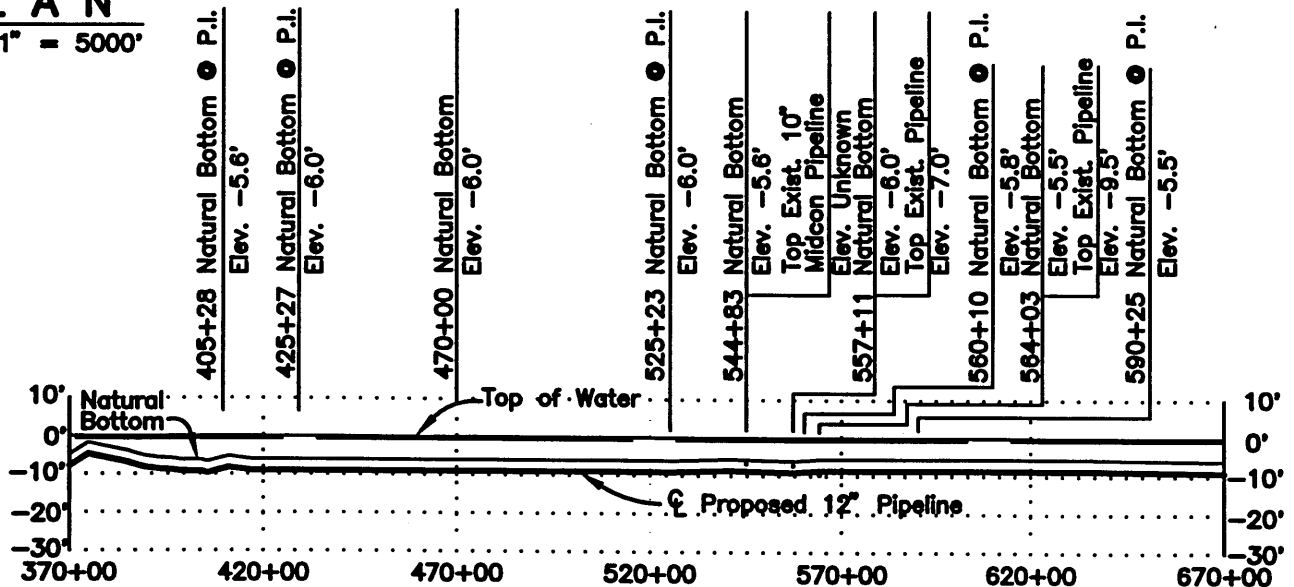
DEC 22 2003



## GALVESTON BAY & TRINITY BAY

### PLAN

Scale: 1" = 5000'



Note: Pipeline will be installed by  
Open Cut method or by jetting.

T.B.M. - Corps Of Engineers tide gauge located in  
the north wall of the Texas City Flood gate  
at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.

### PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/ FUSION BOND EPOXY COATING  
MAX. OPERATING PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

### PROFILE

Scale: 1" = 5000' Horizontal  
1" = 50' Vertical

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 16 of 35

### BUCKEYE GULF COAST PIPE LINES, L.P.

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER GALVESTON BAY & TRINITY BAY  
CHAMBERS COUNTY, TEXAS

DRAWN BY: RCM  
CHECKED BY: G&A  
SCALE: Noted

DATE: 12/03  
DATE: 12/03  
W.D.

SHEET 11 OF 31

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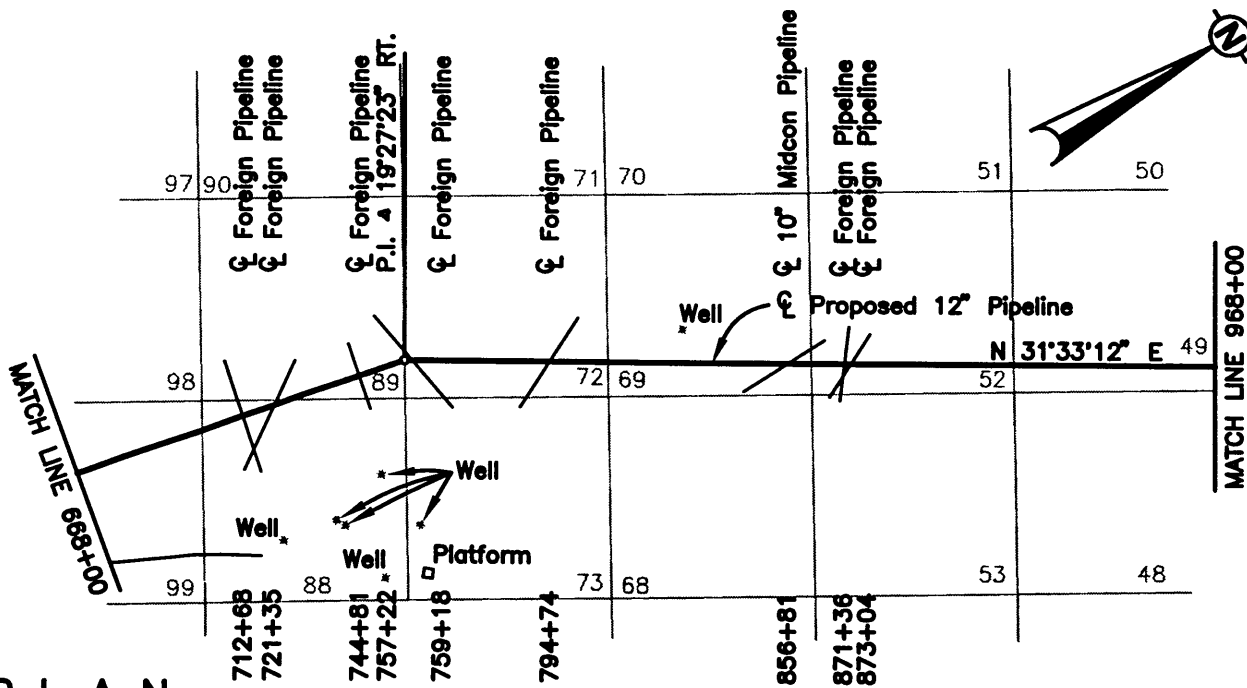
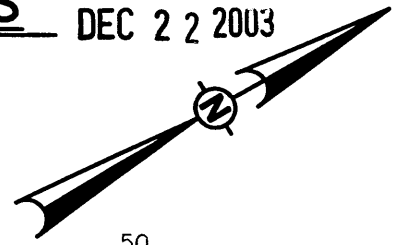


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# CHAMBERS COUNTY, TEXAS

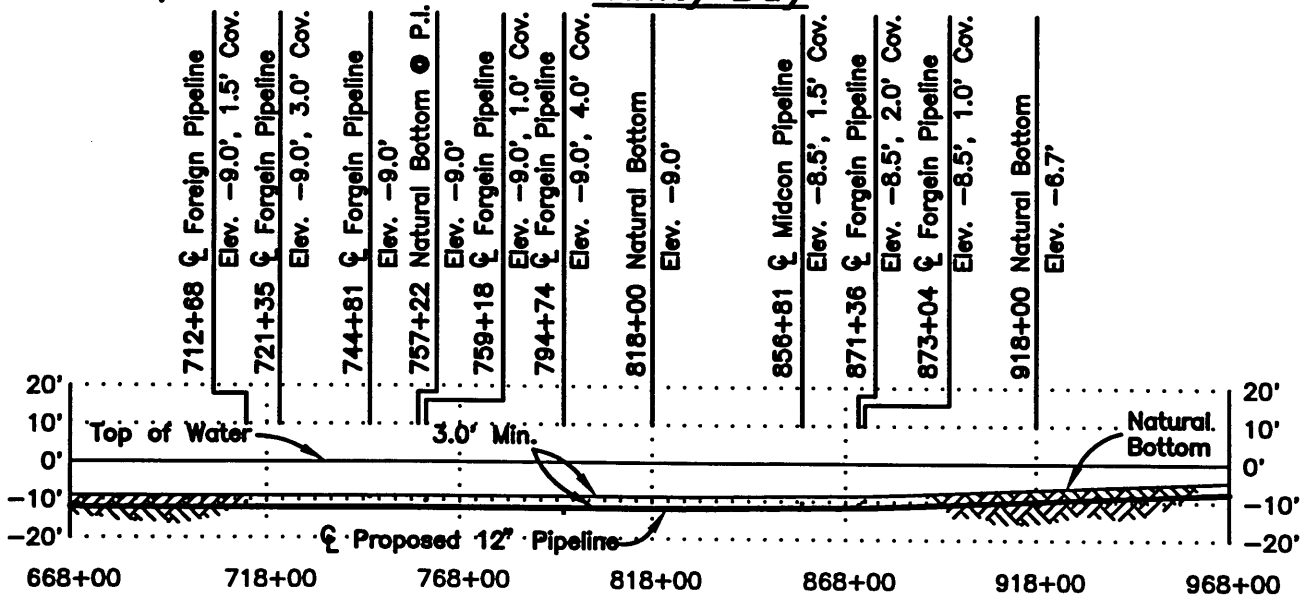
DEC 22 2003



**PLAN**

Scale: 1" = 5,000'

**Trinity Bay**



NOTE: Pipeline will be installed by  
Open Cut method or by Jetting.

**PROFILE**

Scale: 1" = 5,000', Horizontal  
1" = 50', Vertical

T.B.M. - Corps Of Engineers tide gauge located in  
the north wall of the Texas City Flood gate  
at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.

## PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/ FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER TRINITY BAY  
CHAMBERS COUNTY, TEXAS

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 17 of 35

**ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

DRAWN BY: G&A DATE: 12/03  
CHECKED BY: G&A DATE: 12/03  
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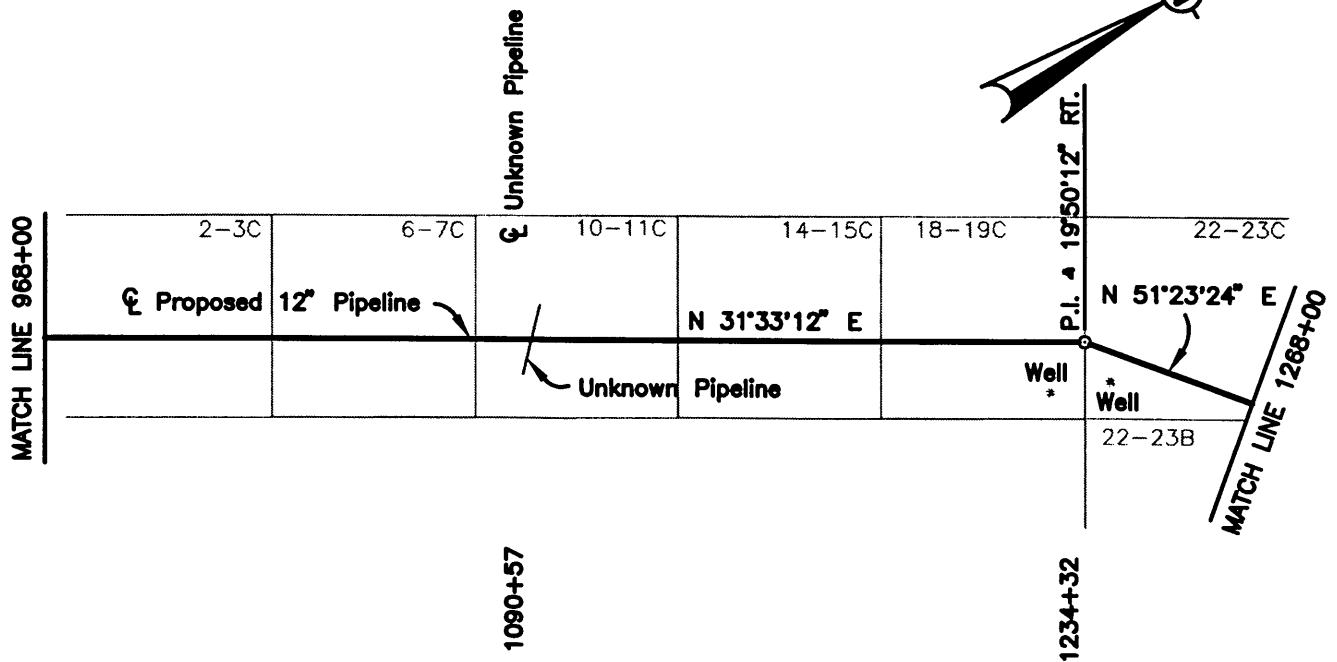
**SHEET 12 OF 31**

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# CHAMBERS COUNTY, TEXAS

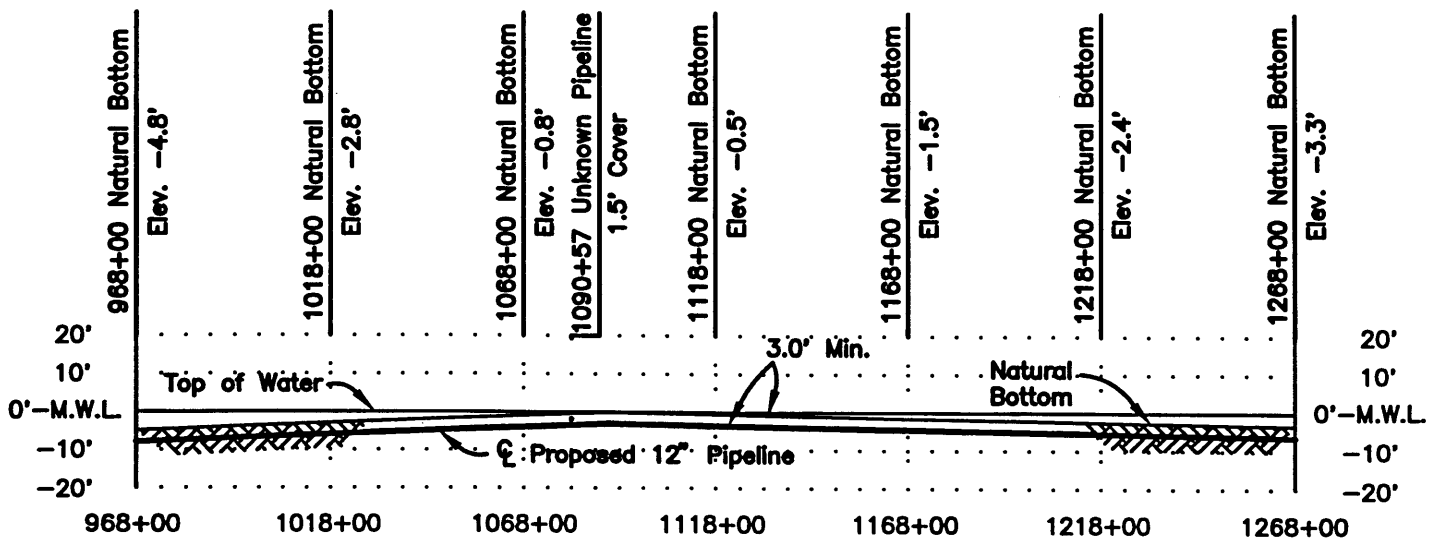
DEC 22 2003



## PLAN

Scale: 1" = 5,000'

Trinity Bay



NOTE: Pipeline will be installed by open cut method or by jetting.

## PROFILE

Scale: 1" = 5,000', Horizontal  
Scale: 1" = 50', Vertical

T.B.M. - Corps Of Engineers tide gauge located in the north wall of the Texas City Flood gate at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.

### PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API5L X52 ERW PIPE  
w/ FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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## BUCKEYE GULF COAST PIPE LINES, L.P.

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TRINITY BAY  
CHAMBERS COUNTY, TEXAS

SHEET 13 OF 31

DRAWN BY: G&A DATE: 12/03  
CHECKED BY: G&A DATE: 12/03  
SCALE: NOTED W.O.

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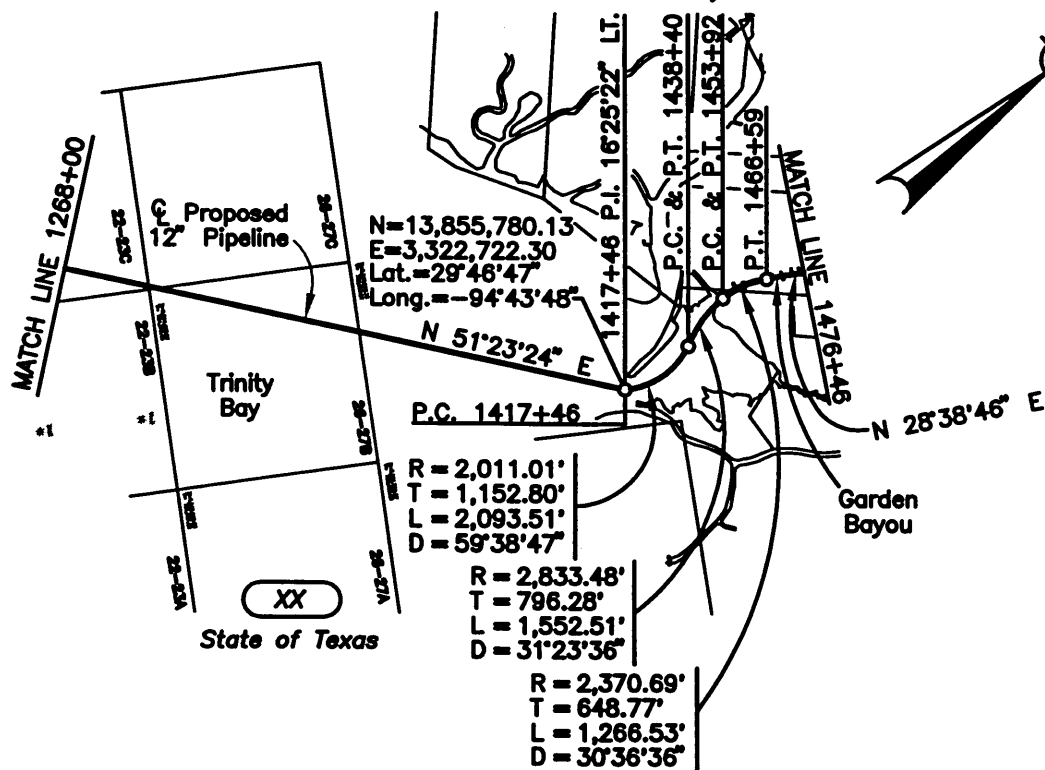
G & A ASSOCIATES, INC.  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219



# CHAMBERS COUNTY, TEXAS

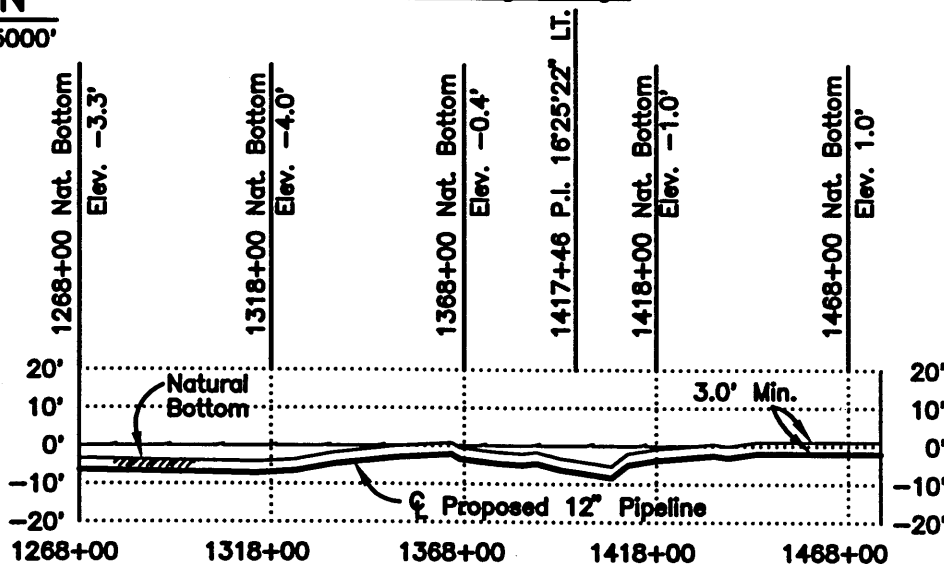
## WASHINGTON STUBBS SURVEY, A-230

DEC 22 2003



### PLAN

Scale: 1" = 5000'



Note: Pipeline will be installed by Open Cut method or by jetting.

### PROFILE

Scale: 1" = 5000' Horizontal  
1" = 500' Vertical

T.B.M. - Corps Of Engineers tide gauge located in the north wall of the Texas City Flood gate at the entrance to Dollar Bay.  
Elev. 0.0' M.L.T.

### PIPE SPECIFICATIONS

CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/ FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE 1440  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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### BUCKEYE GULF COAST PIPE LINES, L.P.

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER TRINITY BAY  
CHAMBERS COUNTY, TEXAS

GULLETT & ASSOCIATES, INC.  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

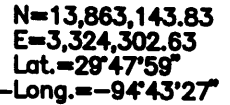
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SHEET 14 OF 31

CAD FILE: 2195133 REV. 0

File Date: 12/16/03 10:30 JDT 2195133\_1"=5000'

DEC 22 2003



**Scale: 1"**



**Scale: 1" = 500' Horizontal**  
**1" = 50' Vertical**

## PIPE SPECIFICATIONS

**CARRIER PIPE: 12.750" O.D. x 0.281" W.T.,  
API 5L X52 ERW PIPE  
w/FUSION BOND EPOXY COATING  
MAX. OPER. PRESSURE: 1440 PSIG  
MIN. TEST PRESSURE: 1800 PSIG  
MIN. YIELD STRENGTH: 52,000 PSI**

**BUCKEYE GULF COAST PIPE LINES, L.P.**

**HOUSTON, TEXAS**

**PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
UNDER TRINITY RIVER  
CHAMBERS COUNTY, TEXAS**

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CHECKED BY: G&A	DATE: 10/03
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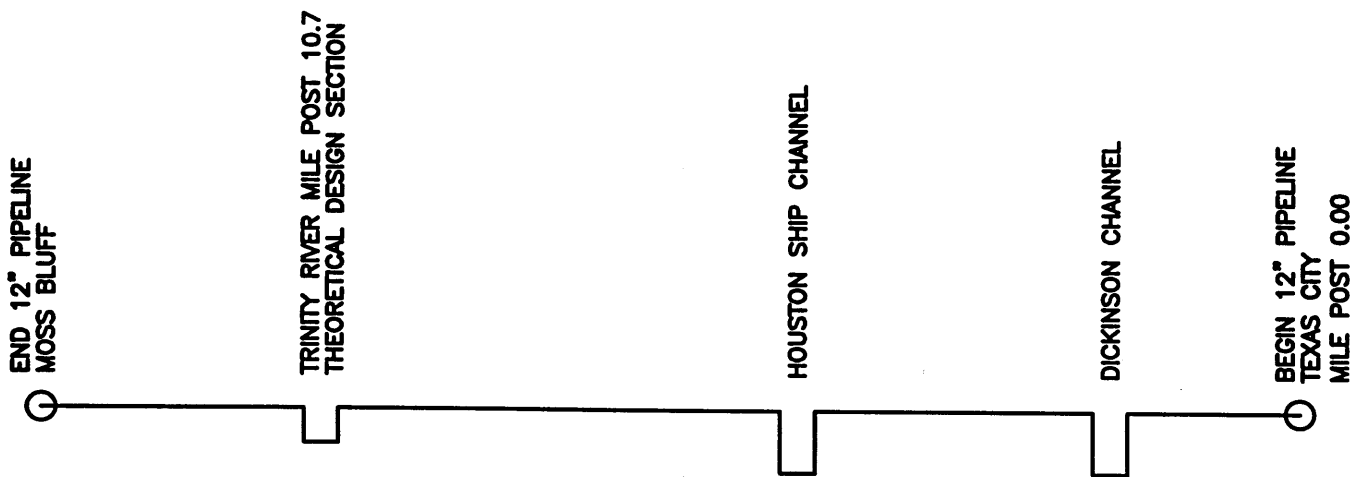
**SHEET 15 OF 31**

CAD FILE: 2195134 REV. 0



# GALVESTON DISTRICT PROJECT CHANNELS

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 Buckeye Gulf Coast Pipelines  
 February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
 MOSS BLUFF TO TEXAS CITY  
 GALVESTON DISTRICT PROJECT CHANNELS

**G**  
**GULLETT & ASSOCIATES, INC.**  
 7705 S. LOOP E. HOUSTON, TEXAS 77012  
 (713) 644-8219

DRAWN BY: MLM DATE: 10/30/03  
 CHECKED BY: G&A DATE: 10/30/03  
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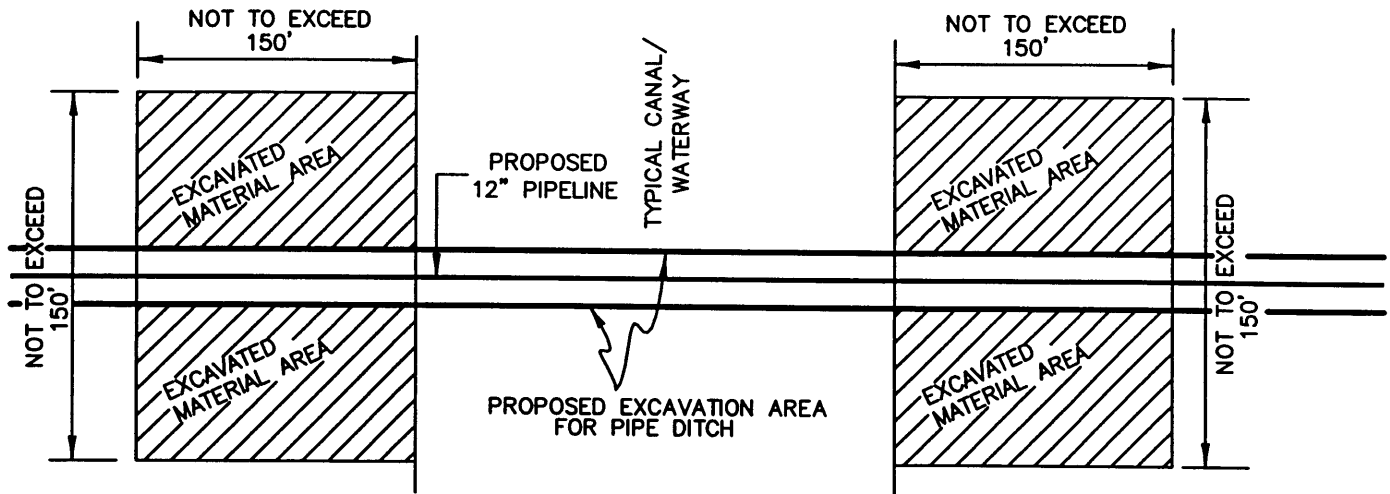
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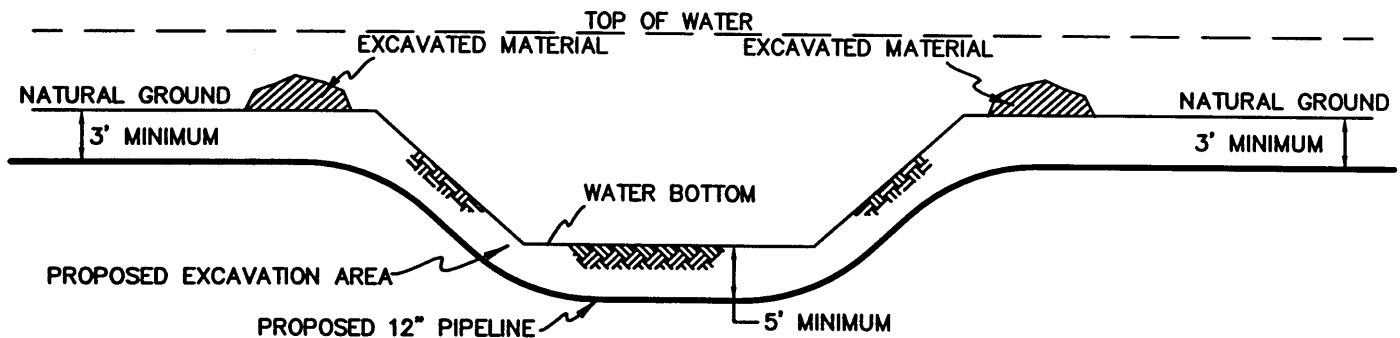
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DEC 22 2003



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PROFILE

File Date: 12/17/03 8:30 AM 2195113

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Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 22 of 35

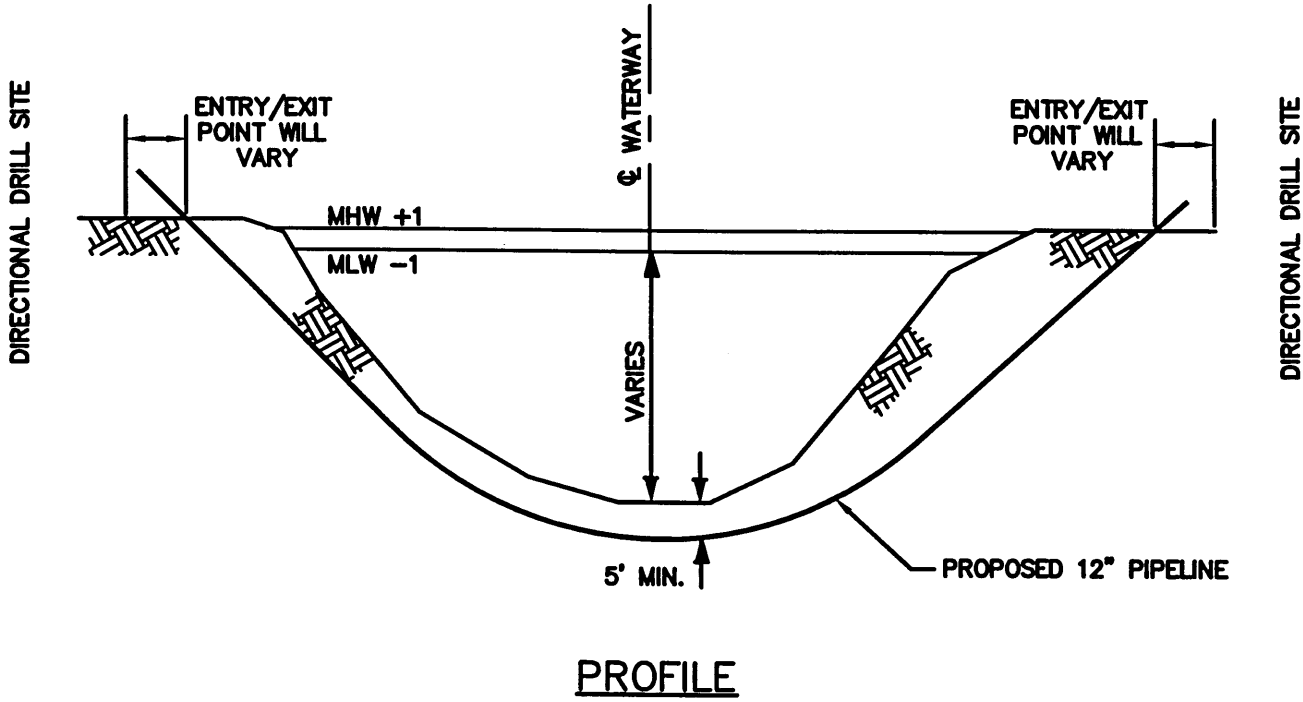
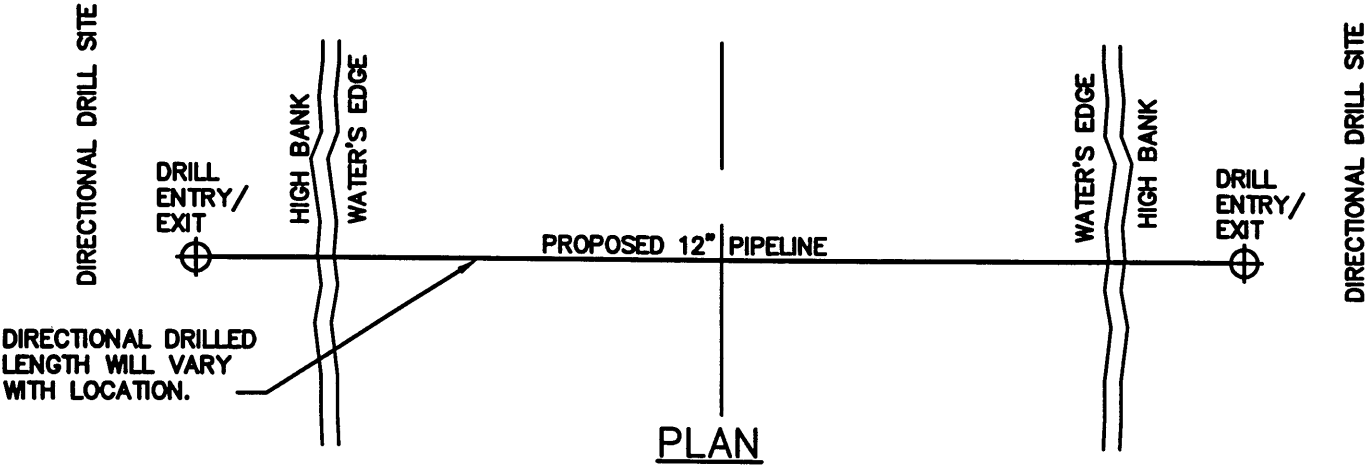
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<b>BUCKEYE GULF COAST PIPE LINES, L.P.</b>			
HOUSTON, TEXAS			
PROPOSED 12" PIPELINE			
MOSS BLUFF TO TEXAS CITY			
DICKINSON CHANNEL - OPEN CUT CROSSING			
PLAN AND PROFILE			
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CHECKED BY: G&A	DATE: 10/03		
SCALE: N.T.S.	SHT:		
CAD FILE: 2195113_		REV. 0	



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(713) 644-8219

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Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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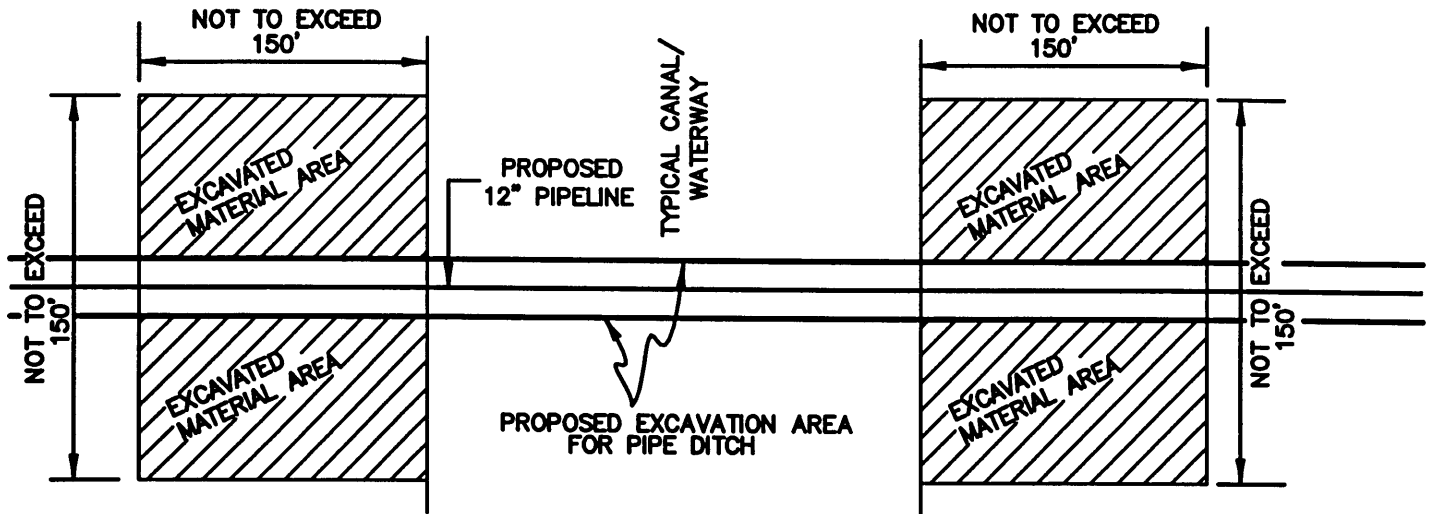
<b>BUCKEYE GULF COAST PIPE LINES, L.P.</b>			
HOUSTON, TEXAS			
PROPOSED 12" PIPELINE MOSS BLUFF TO TEXAS CITY TYPICAL DIRECTIONAL DRILL WATERWAY INSTALLATION PLAN AND PROFILE			
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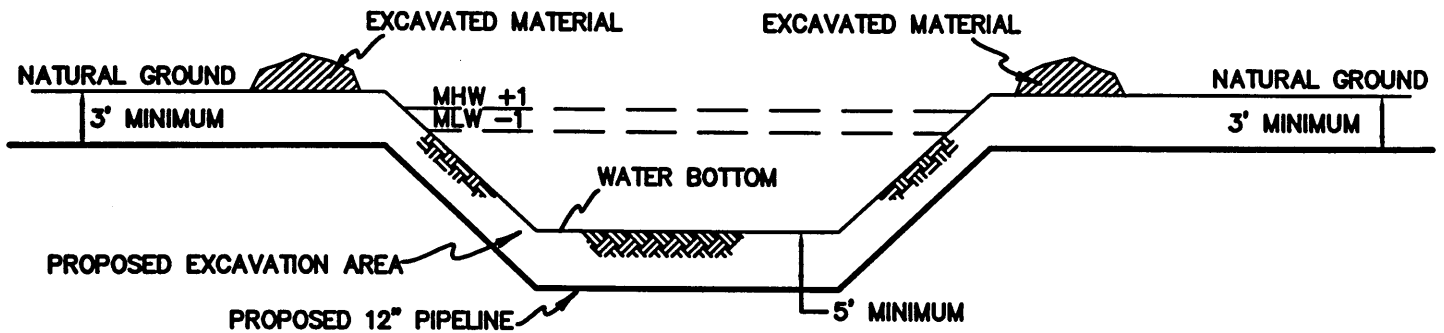
**GULLETT & ASSOCIATES, INC.**  
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(713) 644-8219

File Date: 12/17/03 & 48 KC "N.T.S." 2195114\_

DEC 22 2003



PLAN



PROFILE

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Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL OPEN-CUT WATERWAY CROSSING  
PLAN AND PROFILE

DRAWN BY: RER DATE: 10/03  
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**SHEET 19 OF 31**

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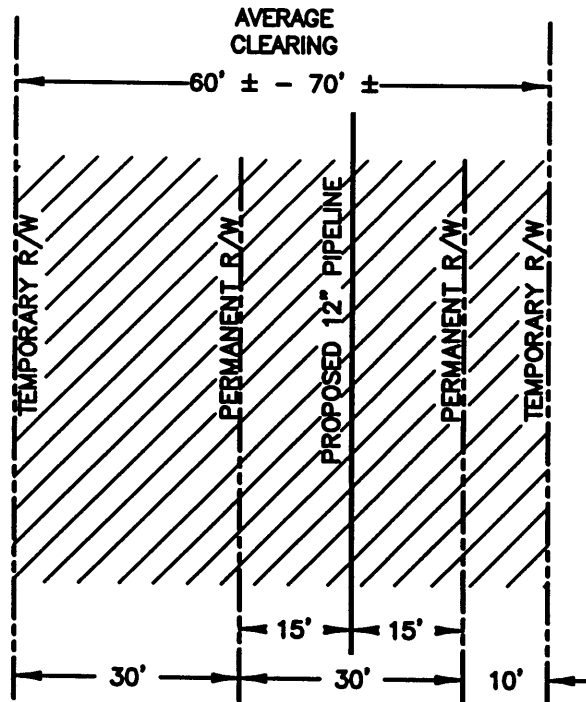


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7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

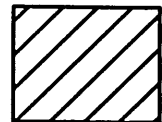
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DEC 22 2003



PLAN  
N.T.S.



INDICATES  
CLEARING

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL RIGHT-OF-WAY, FORESTED WETLAND  
LIBERTY & CHAMBERS COUNTY, TEXAS

DRAWN BY: MLM DATE: 10/29/03  
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**SHEET 20 OF 31**

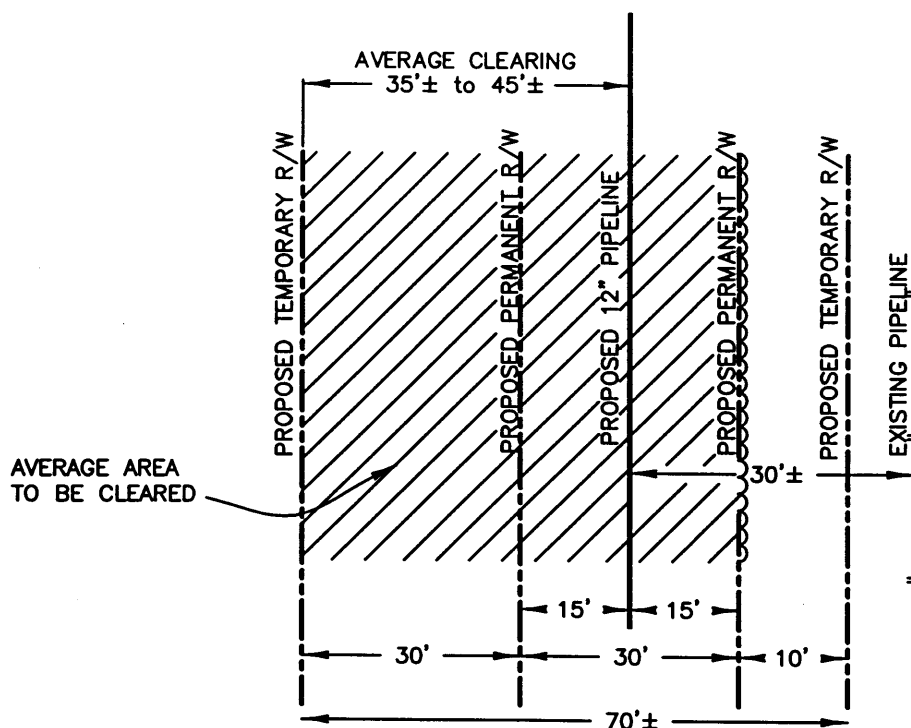
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**GULLETT & ASSOCIATES, INC.**  
7706 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

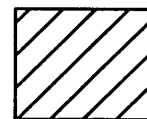
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DEC 22 2003



PLAN  
N.T.S.



INDICATES  
CLEARING

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 26 of 35

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL R/W, FORESTED WETLAND-PARALLEL PIPELINE  
LIBERTY & CHAMBERS COUNTY, TEXAS

NO.	DATE

REVISION	BY

**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

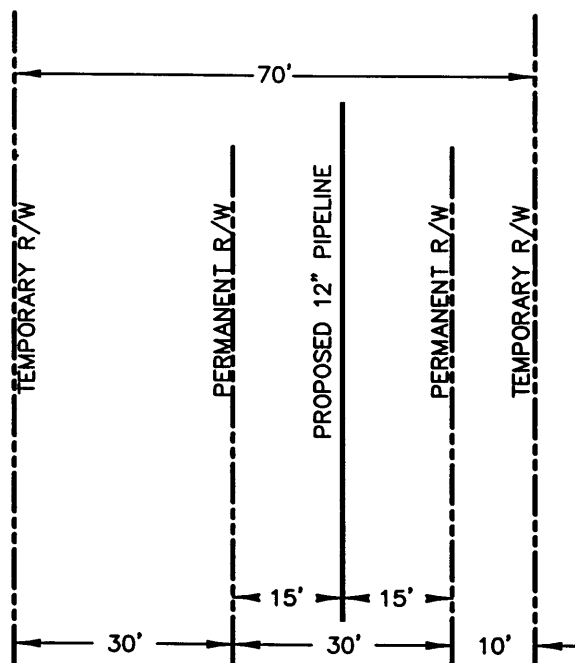
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**SHEET 21 OF 31**

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DEC 22 2003



PLAN  
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File Date: 12/16/03 9:00 RCM "N.T.S." 2195112\_

NO.	DATE

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 27 of 35

BY



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7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

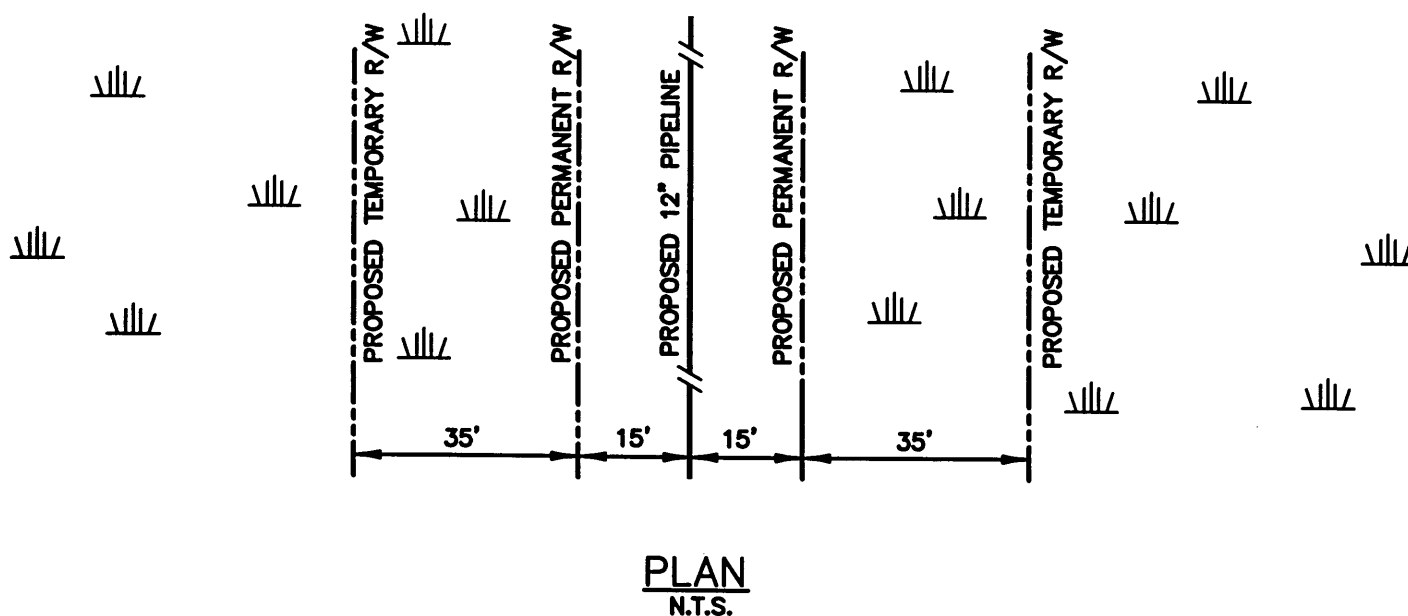
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MOSS BLUFF TO TEXAS CITY  
TYPICAL RIGHT-OF-WAY, NONFORESTED WETLAND  
LIBERTY & CHAMBERS COUNTY, TEXAS

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SCALE: N.T.S.	SHT:

<b>SHEET 22 OF 31</b>	CAD FILE: 2195112_	REV. 0
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DEC 22 2003



NOTE: APPLIES TO NONFORESTED WETLAND  
(MARSH) SOUTH OF LAND PUSH SITE.  
SHOWN ON SHEET 6 OF 31.

GALVESTON DISTRICT

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL RIGHT-OF-WAY OF MARSH  
CHAMBERS COUNTY, TEXAS

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 28 of 35

NO. DATE

REVISION

BY

DRAWN BY: RCM

DATE: 12/16/03

CHECKED BY: G&A

DATE: 12/16/03

SCALE: N.T.S.

SHT:

CAD FILE: 2195118\_

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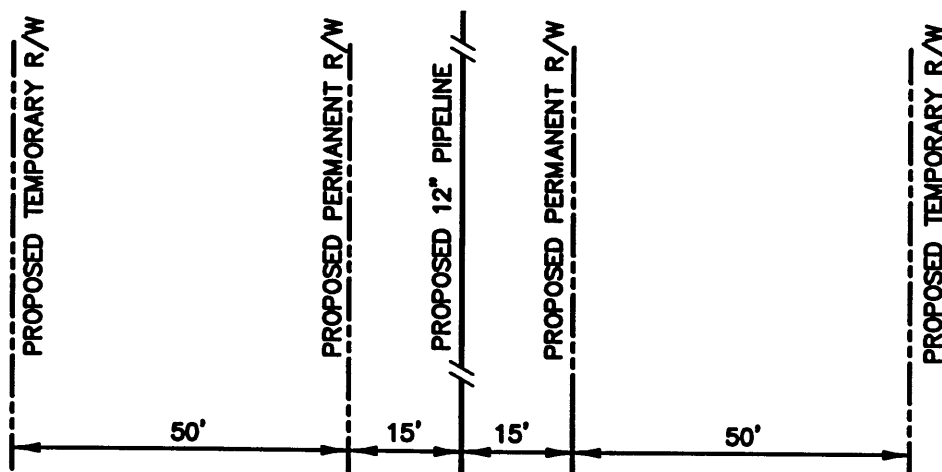
**SHEET 23 OF 31**



**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

File Date: 12/16/03 10:30 RCM "N.T.S." 2195118\_

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**PLAN**  
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Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 29 of 35

NO.	DATE

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(713) 644-8219

GALVESTON DISTRICT

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

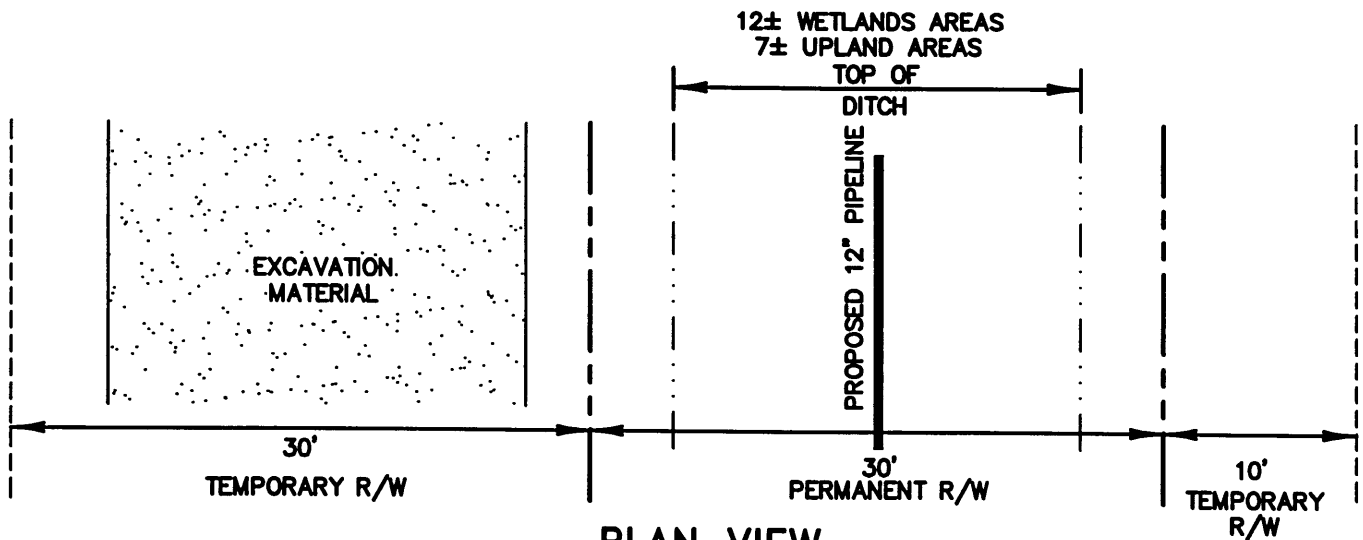
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MOSS BLUFF TO TEXAS CITY  
TYPICAL RIGHT-OF-WAY OF BAY  
CHAMBERS COUNTY, TEXAS

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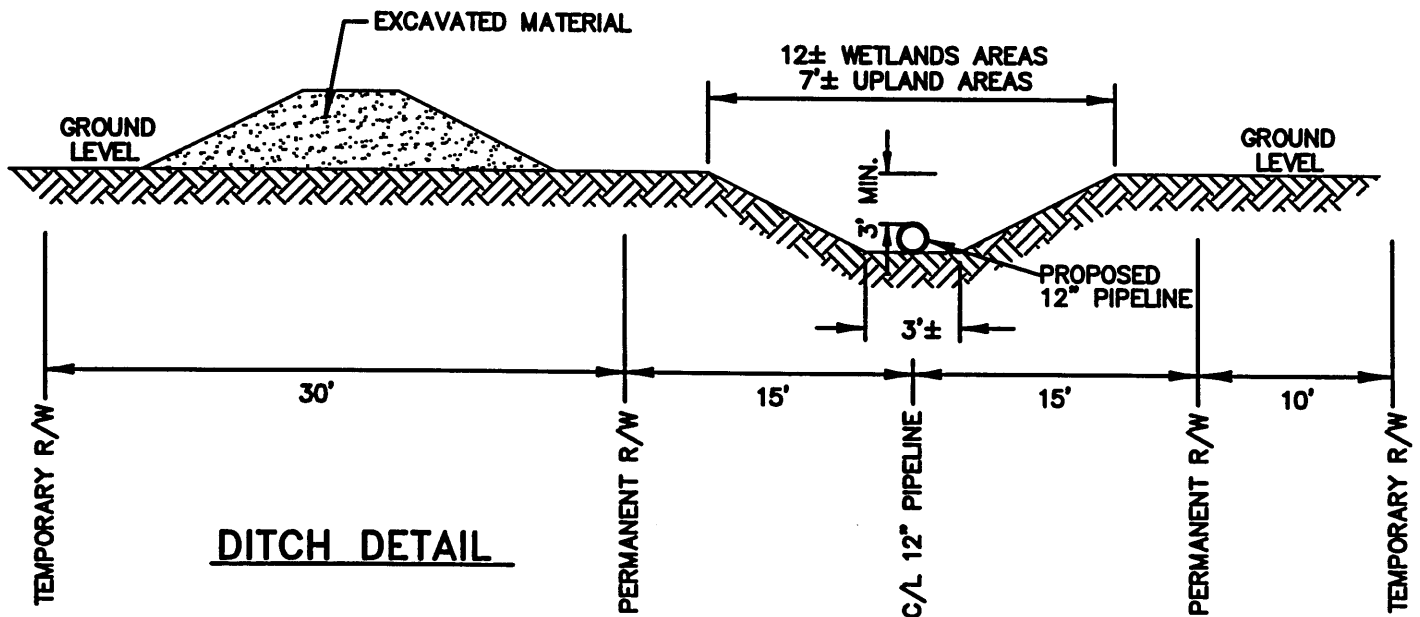
**SHEET 24 OF 31**

CAD FILE: 2195119_	REV. 0
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DEC 22 2003



**PLAN VIEW**



**DITCH DETAIL**

**NOTE:**

1. EXCAVATED MATERIAL TO BE STOCKPILED ON JOB SITE ADJACENT TO PIPE DITCH. AVAILABLE MATERIAL TO BE USED AS BACKFILL FOLLOWING PIPELINE INSTALLATION.
2. PIPELINE TO BE BURIED 3' MIN. BELOW NATURAL GROUND & 5' MIN. BELOW ALL CANALS & DITCHES EXCEPT AS NOTED OTHERWISE ON PLANS.

File Date: 12/19/03 8:00 RCM 2195120\_

NO.	DATE

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 30 of 35



**G & A ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

BY

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL PIPE DITCH/PLAN & PROFILE  
UPLAND & WETLAND AREAS

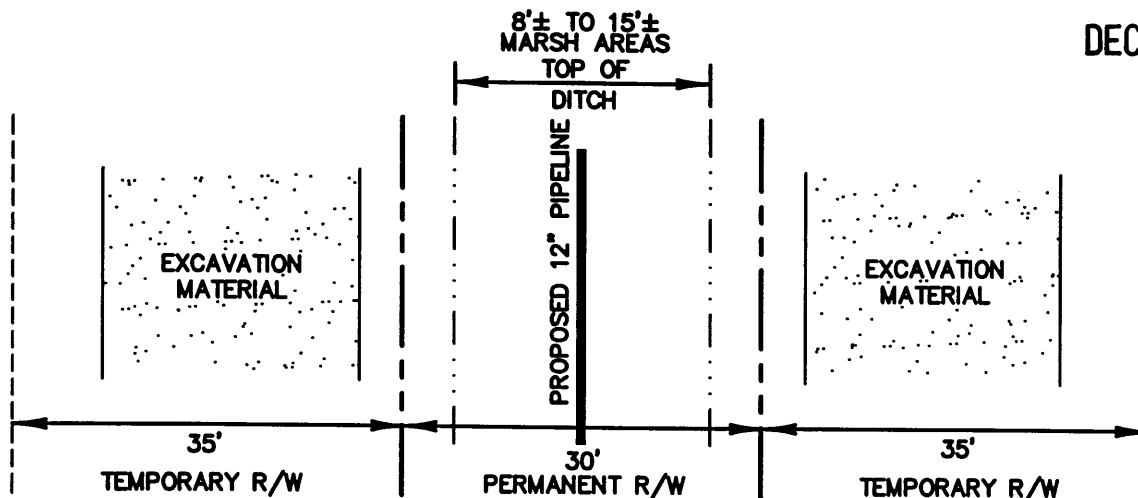
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**SHEET 25 OF 31**

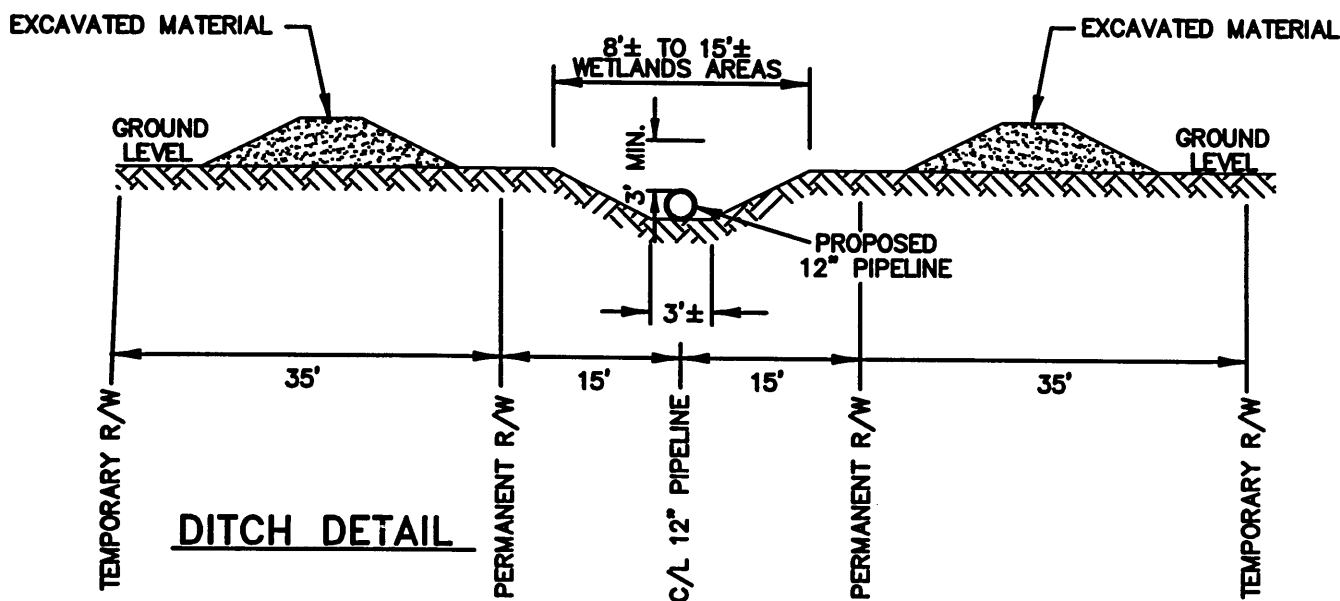
CAD FILE: 2195120\_ REV. 0



DEC 22 2003



**PLAN VIEW**



**DITCH DETAIL**

**NOTE:**

1. EXCAVATED MATERIAL TO BE STOCKPILED ON JOB SITE ADJACENT TO PIPE DITCH. AVAILABLE MATERIAL TO BE USED AS BACKFILL FOLLOWING PIPELINE INSTALLATION.
2. PIPELINE TO BE BURIED 3' MIN. BELOW NATURAL GROUND & 5' MIN. BELOW ALL CANALS & DITCHES EXCEPT AS NOTED OTHERWISE ON PLANS.

NOTE: APPLIES TO NONFORESTED WETLAND (MARSH) SOUTH OF LAND PUSH SITE. SHOWN ON SHEET 6 OF 31

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
Page 31 of 35

**GULLETT & ASSOCIATES, INC.**  
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(713) 644-8219

**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

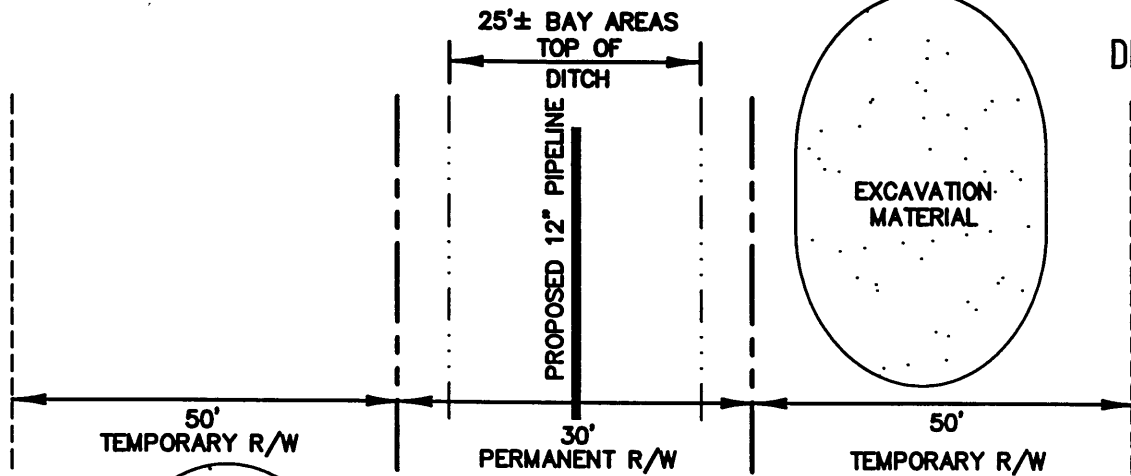
PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL PIPE DITCH/PLAN & PROFILE  
MARSH AREA

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CHECKED BY: G&A DATE: 12/03  
SCALE: N.T.S. SHT:

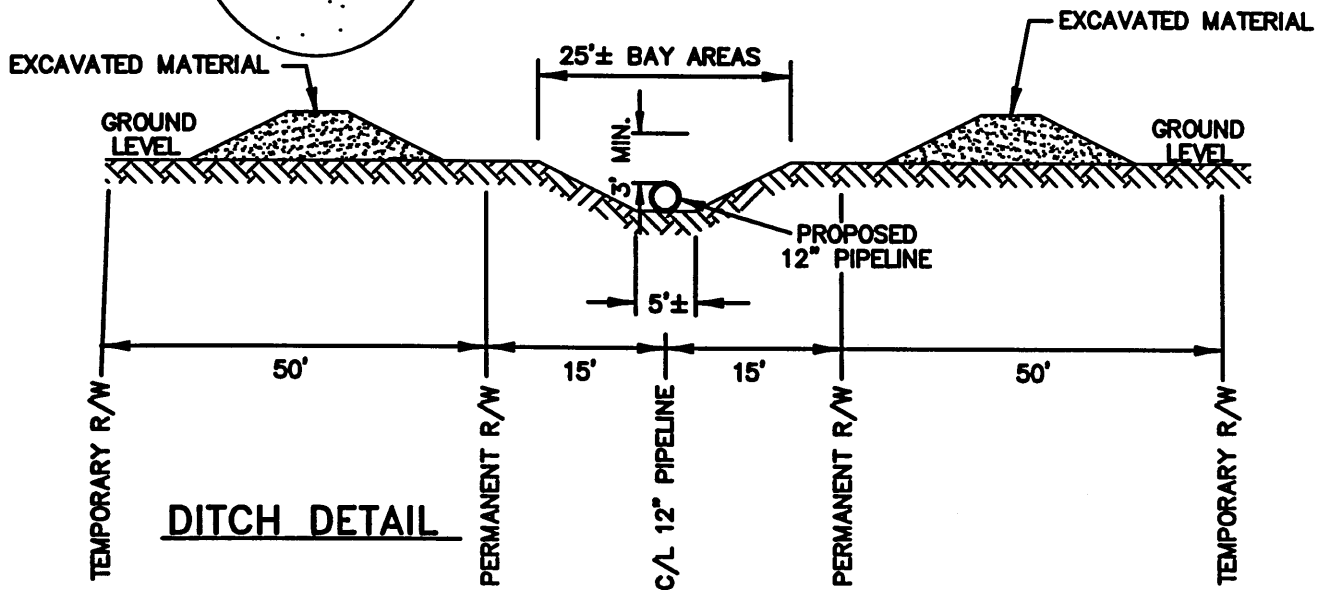
**SHEET 26 OF 31**

CAD FILE: 2195121\_ REV. 0

DEC 22 2003



**PLAN VIEW**



**DITCH DETAIL**

**NOTE:**

1. PIPELINE TO BE BURIED BY OPEN CUT METHOD OR BY JETTING.
2. PIPELINE TO BE BURIED 3' MIN. BELOW NATURAL GROUND & 5' MIN. BELOW ALL CANALS & DITCHES EXCEPT AS NOTED OTHERWISE ON PLANS.
3. WHEN BURIED BY OPEN CUT METHOD EXCAVATED MATERIAL TO BE STOCKPILED ON JOB SITE ADJACENT TO PIPE DITCH. AVAILABLE MATERIAL TO BE USED AS BACKFILL FOLLOWING PIPELINE INSTALLATION.

Permit Number 23290  
 Buckeye Gulf Coast Pipelines  
 February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
 MOSS BLUFF TO TEXAS CITY  
 TYPICAL PIPE DITCH/PLAN & PROFILE  
 BAY AREA

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CHECKED BY: G&A	DATE: 12/03
SCALE: N.T.S.	SHT:

**SHEET 27 OF 31**

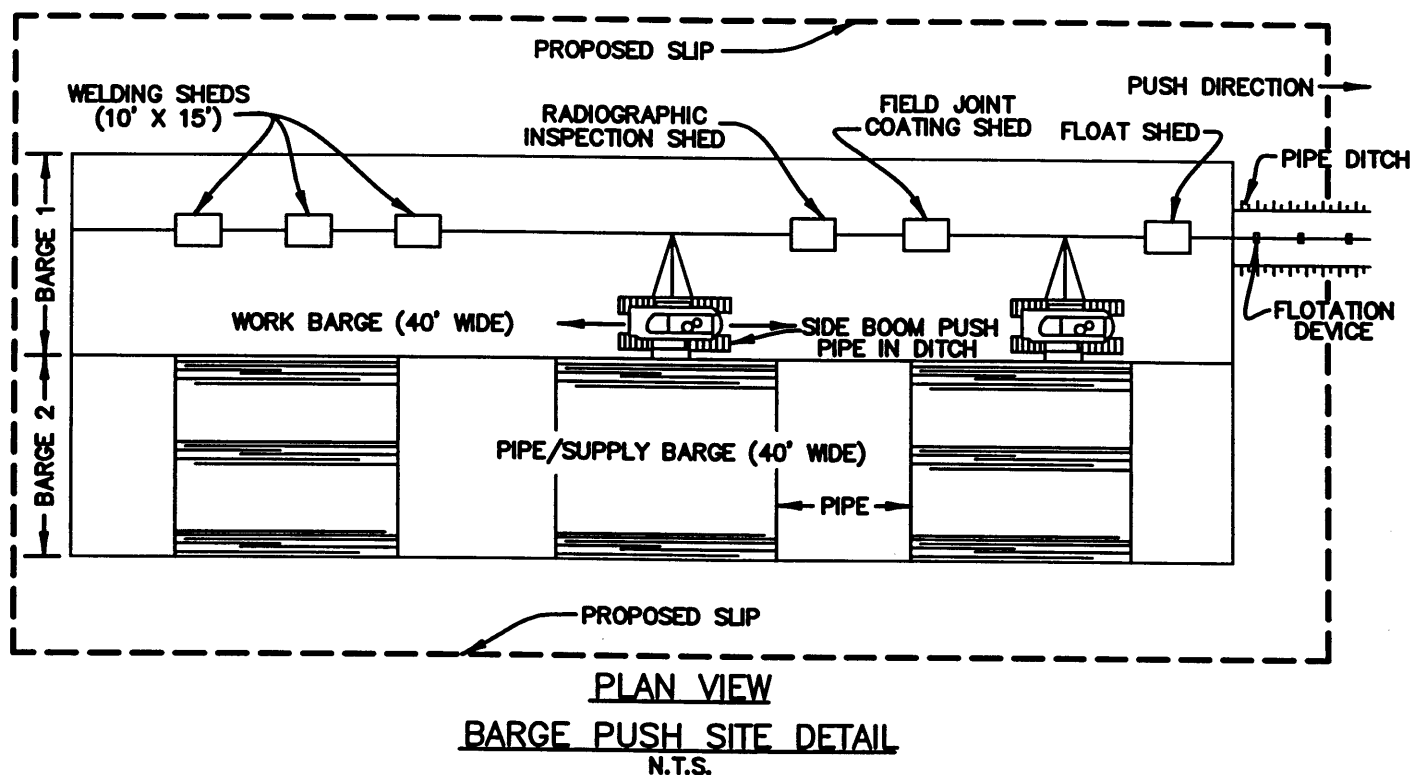
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**G&A ENGINEERING, INC.**  
 7705 S. LOOP E. HOUSTON, TEXAS 77012  
 (713) 644-8219

DEC 22 2003



File Date: 12/18/03 11:00 DPS 2195123

NO.	DATE

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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BY

**BUCKEYE GULF COAST PIPE LINES, L.P.**  
HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL BARGE PUSH SITE DETAIL



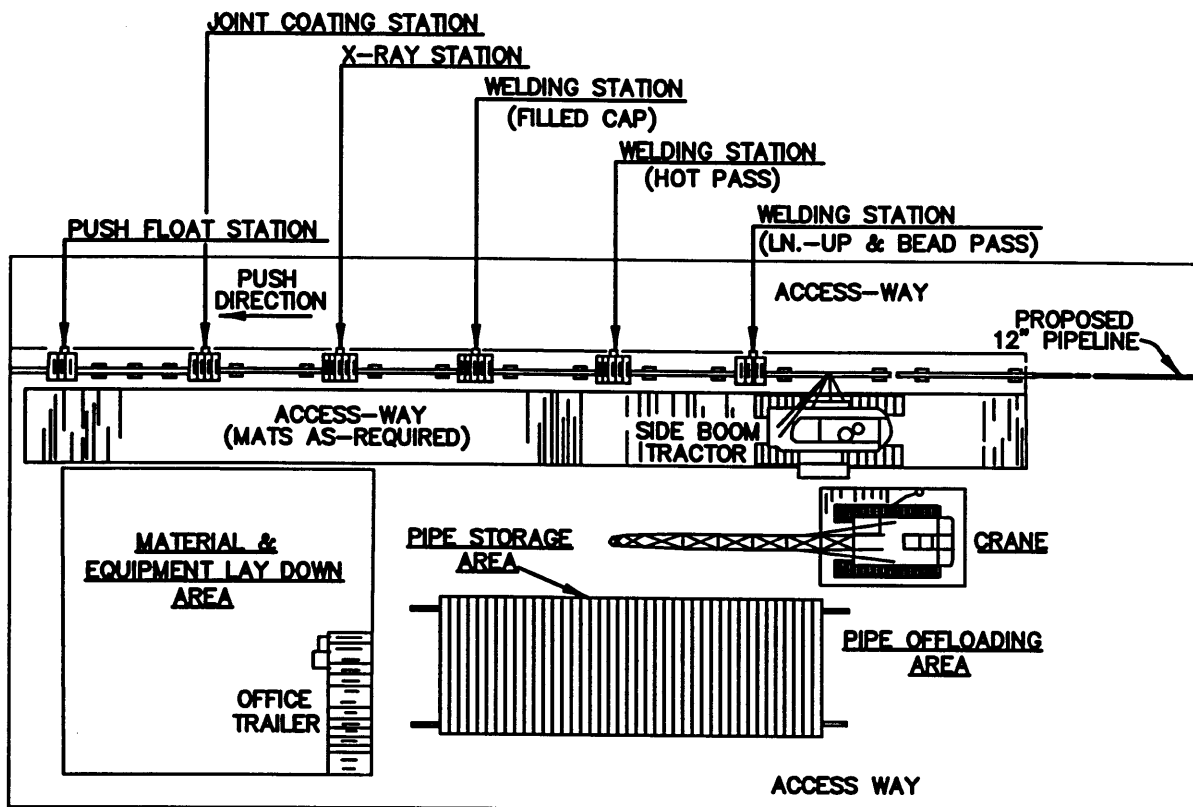
**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-3219

DRAWN BY: RER DATE: 10/03  
CHECKED BY: G&A DATE: 10/03  
SCALE: N.T.S. SHT:

**SHEET 28 OF 31**

CAD FILE: 2195123\_ REV. 0

DEC 22 2003



**PLAN VIEW**  
**LAND PUSH SITE DETAIL**  
N.T.S.

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
TYPICAL TEMPORARY  
LAND PUSH SITE



**GULLETT & ASSOCIATES, INC.**  
7705 S. LOOP E. HOUSTON, TEXAS 77012  
(713) 644-8219

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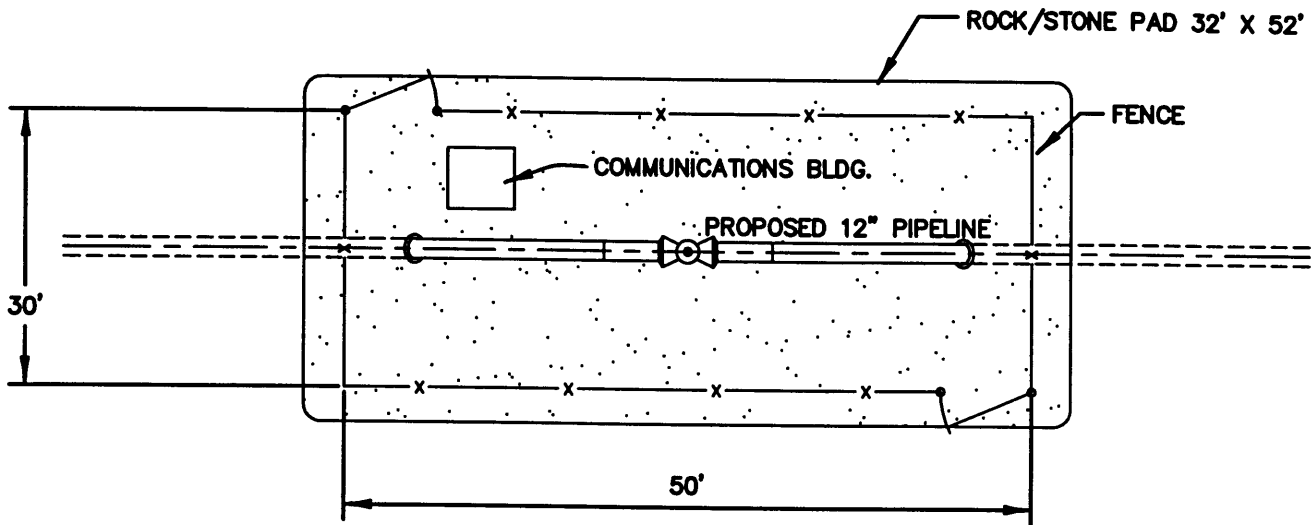
**SHEET 29 OF 31**

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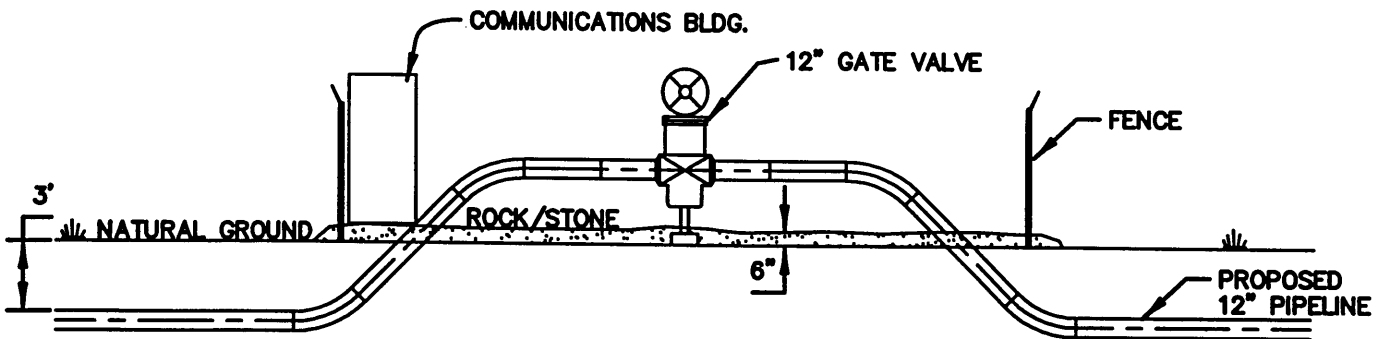
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DEC 22 2003



**PLAN**



**PROFILE**

80 C.Y. TOTAL STONE FILL  
REQUIRED FOR VALVE SITES

Permit Number 23290  
Buckeye Gulf Coast Pipelines  
February 23, 2004  
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**BUCKEYE GULF COAST PIPE LINES, L.P.**

HOUSTON, TEXAS

PROPOSED 12" PIPELINE  
MOSS BLUFF TO TEXAS CITY  
PLAN AND PROFILE  
TYPICAL VALVE SITE

**GULLETT & ASSOCIATES, INC.**  
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DRAWN BY: RER DATE: 10/03  
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SCALE: N.T.S. SHT:

**SHEET 30 OF 31**

CAD FILE: 2195125\_ REV. 0

File Date: 12/18/03 11:30 DPS 2195125\_

**BUCKEYE GULF COAST PIPE LINES, L.P.  
MOSS BLUFF TO TEXAS CITY HYDROGEN PIPELINE PROJECT  
LIBERTY, CHAMBERS, AND GALVESTON COUNTIES, TEXAS**

**MITIGATION, RESTORATION, AND MONITORING PLAN**

**January 20, 2004**

The following document contains information relative to wetland mitigation, restoration, and monitoring for Individual Permit Application 23290 submitted to the U.S. Army Corps of Engineers (USACE).

**BACKGROUND**

Buckeye Gulf Coast Pipe Lines, L.P. (Buckeye) is proposing the construction of approximately 38 miles of a 12-inch diameter pipeline, known as the 12" Moss Bluff to Texas City Hydrogen Pipeline. The proposed route begins in the Moss Bluff area in Liberty County north of Interstate Highway 10 (I-10) and east of Wallisville Reservoir. The route proceeds south then southwest, crossing Trinity and Galveston Bays. The route ends west of Dollar Point in Texas City, Texas. Buckeye proposes to begin construction on June 1, 2004.

North of Old Wallisville Road, the pipeline primarily parallels existing pipeline corridors, crossing through a variety of forested and non-forested upland and wetland habitats. South of Old Wallisville Road, the route crosses a narrow band of upland forest before descending into a variety of wetland habitats, including forested, scrub-shrub, and palustrine emergent (PEM) fresh marsh.

Wetland habitats between Old Wallisville Road and the Trinity River are completely enclosed within a levee system that begins at Wallisville Reservoir and wraps around land all the way to the north end of Lake Anahuac. Hydrology is provided from sheet flow into the marsh from the north. Hydrology is controlled via pumps that pump water over the levee and out of the marsh into the Trinity River and Lake Anahuac. Much of the wetland habitat south of Old Wallisville Road has been historically used for rice production. Today, the area south of Old Wallisville Road, including the PEM fresh marsh, belongs to private landowners and is used for cattle grazing.

South of the Trinity River, the preferred route avoids and minimizes salt marsh impacts by directional drill before crossing into Trinity Bay. The route crosses approximately 28 miles of Trinity and Galveston Bays before coming ashore in upland pasture inside the Texas City Levee west of Dollar Point. Please refer to SWCA's preliminary wetland delineation for a discussion of all temporary and permanent wetland impacts associated with this project.

## **MITIGATION**

The USACE preferred sequencing of wetland impact avoidance, minimization, and finally compensatory mitigation has been followed throughout project development. Please refer to SWCA's Alternatives Analysis for a detailed description of impact avoidance and minimization through the route selection process. Buckeye has chosen a preferred route that avoids and minimizes wetland impacts to the maximum extent practicable. In addition, Buckeye has reduced typical ROW widths in wetland areas as much as possible.

Temporary impacts to non-forested wetlands will be mitigated on-site during and post-construction by ROW restoration and monitoring as detailed below. On-site mitigation for permanent impacts (i.e. forested wetlands) is not logistically feasible. Buckeye does not hold title to the project ROW. In addition, no practicable mitigation alternatives have been identified near the proposed project. Therefore, off-site mitigation in the same watershed is proposed for unavoidable permanent project impacts.

### **Temporary Impacts**

Temporarily impacted areas are those necessary to have sufficient workspace to construct the pipeline. All impacts to non-forested wetland areas will be temporary. Please refer to SWCA's Wetland Delineation for acreages and locations of temporary wetland impacts.

Best Management Practices (BMPs) to minimize temporary impacts during construction will include:

- The use of low-ground weight equipment in wetland areas during pipeline construction.
- Limited passes through wetland areas will be employed and construction equipment in wetland areas will be limited to that needed to install the pipeline and restore the ROW.
- Excavated materials will be placed in such a manner as to not significantly alter drainage.
- Soil erosion controls such as silt fencing will be utilized, as necessary, to prevent sedimentation of adjacent habitat.
- Buckeye proposes to construct the pipeline primarily utilizing conventional pipeline construction methods. However, Buckeye proposes to minimize impacts in the emergent fresh marsh south of Old Wallisville Road by employing the "push" method. This method helps minimize traffic up and down the pipeline construction corridor and associated wetland impacts. The "push" method of construction will consist of trench excavation and sidecast of excavated material using a wide-tracked backhoe, marsh backhoe or marsh dragline. After the desired length of trench has been excavated, adjacent water and groundwater fill the trench. Individual pipe joints will be welded at a temporary extra workspace area at the north end of the marsh, and as each joint is successfully welded, the pipeline will be floated or "pushed" down the trench. Once the pipeline has been

floated to both ends, it is sunk in place. The trench is then refilled using the adjacent excavated material.

- In the emergent fresh water marsh south of Old Wallisville Road, the top 12 to 16 inches of soil will be segregated during temporary sidecasting and replaced in the top portion of the backfilled trench. This will help reestablishment of wetland vegetation following pipeline installation.
- The Trinity River, Big Hog Bayou, and Houston Ship Channel, as well as pipeline transitions from onshore to offshore areas, will be installed via directional drill which will avoid and minimize impacts to waters of the U.S., including wetlands.

### **Permanent Impacts**

Permanently impacted areas include those wetland areas which are currently forested, but that will be cleared during construction and/or maintained in an herbaceous state throughout existence of the pipeline for inspection and safety reasons. Buckeye has avoided and minimized impacts to forested wetland areas to the maximum extent practicable. Please refer to SWCA's Wetland Delineation for acreages and locations of forested wetland impacts.

Compensatory mitigation is proposed for unavoidable impacts to forested wetlands. Buckeye proposes to conduct compensatory mitigation in accordance with the USACE Galveston District In-Lieu Fee Mitigation program with an approved In-Lieu-Fee Operator.

Buckeye proposes to enter into an In-Lieu Fee mitigation agreement with the National Fish and Wildlife Foundation. Buckeye anticipates making a contribution to the National Fish and Wildlife Foundation's Lower Trinity River Habitat Fund. This contribution would then be used to acquire, preserve, enhance and/or restore wetland habitat in the Lower Trinity River watershed. This will provide mitigation in the same watershed as the proposed project's unavoidable wetland impacts.

Neither a mitigation ratio, nor a contribution amount, has been proposed for this project at the time of this writing. Buckeye proposes to discuss mitigation costs with National Fish and Wildlife Foundation upon initial agency concurrence. A complete mitigation plan with monitoring parameters will be provided to the USACE by the In-Lieu-Fee Operator. The In-Lieu-Fee Operator will assume all responsibility for restoration, monitoring, and success of mitigation for impacts to forested wetlands.

### **RESTORATION**

The grade of the entire ROW will be restored to pre-project contours using available spoil to the maximum extent practicable. Pre-construction terrestrial and aquatic resources will be allowed to re-vegetate naturally upon project completion.



## MONITORING

Temporary impacts to emergent wetland areas north of Old Wallisville Road occur within or immediately adjacent to existing pipeline ROWs or clear-cut areas. Based on previous project experience, Buckeye anticipates that these areas will reestablish with comparable wetland vegetation.

Buckeye proposes post-construction vegetation surveys (monitoring) of the PEM fresh marsh wetland south of Old Wallisville Road (south of the proposed "push" site) to ensure successful restoration. For purposes of this project, successful restoration is defined as reestablishment of **greater than 50% cover of hydrophytic vegetation** in impacted wetland areas within two complete growing seasons following construction.

Monitoring will occur after the first complete growing season following construction. If the success criterion is not met after the first growing season following construction, a second monitoring survey will be conducted after the second growing season. Areas not meeting the success criteria after the second monitoring will be planted and/or seeded with comparable, commercially available wetland species. Monitoring will continue annually until the success criterion is met. Success of restoration measures will be documented in report form to the USACE within 30 days after completion of each monitoring survey.